

Shopping Around for Micros: \$4000-\$6000

MICROCOMPUTING®

WAYNE GREEN PUBLICATION

November 1983

USA \$2.95

Number 83

Don't Let Your Micro Push You Around

Four Innovative Programs to Sweep You Away

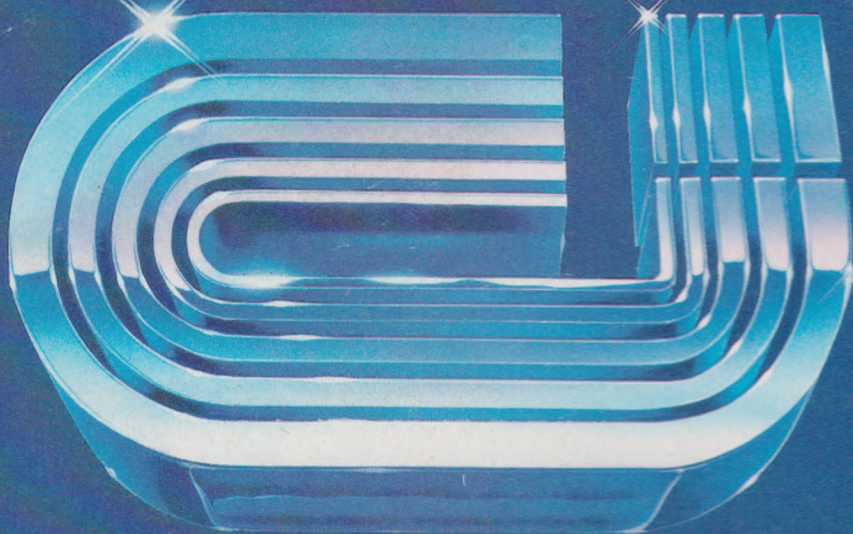
A "10"
For Kaypro,
An "11"
For Osborne

Putting Apple
And IBM
On Speaking
Terms

Plus:
Conclusions to
H120 and
Micro-
Professor
Reviews



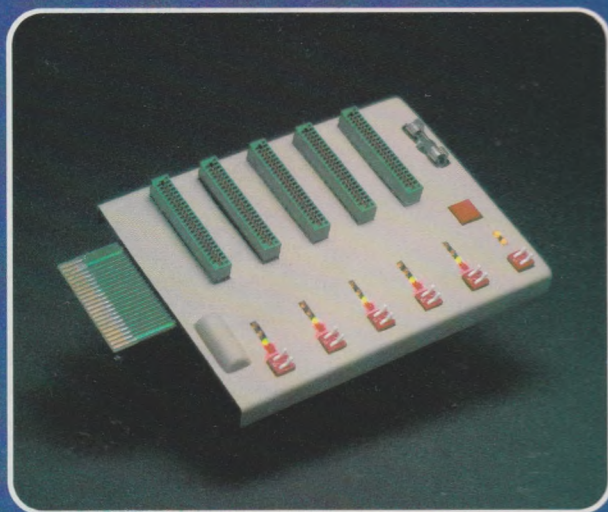
New From Cardco



Five Slot Expansion Interface for the C-64

The CARDBOARD/5 (CB/5) is an enclosed five slot, fully switch selectable, expansion interface for the Commodore 64™. This quality product allows the user to switch select any cartridge slot or combination of cartridge slots. Twenty-two color coded light emitting diodes give status indication. Each slot has four LEDs and two toggle switches for indication and control. Two master toggle switches allow the user to manually override any situation.

All Cardco products are individually tested to insure quality and reliability.



Some of the features of the CARDBOARD/5 are:

- high quality glass/epoxy circuit board
- gold plated contacts
- logic lines are switched by solid state IC switches
- full LED status indication
- convenient toggle switches

- full support under the board to prevent flexing
- full plastic enclosure to insure safety
- fused to protect your computer
- convenient reset button
- CARDCO, Inc.'s exclusive Lifetime Guarantee



See a complete line of American made Cardco Products at a computer store near you, today.

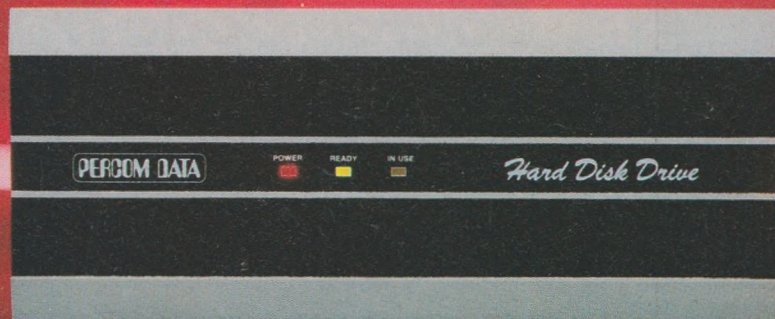
313 Mathewson • Wichita, Kansas 67214 • (316) 267-6525

Commodore 64™ is a registered trademark of Commodore Business Systems, Inc.


cardco, inc.

Circle 85 on Reader Service card.

ONE



SEE US AT COMDEX
Booth #536

FOR ALL

IE • IBM-PC • APPLE II • TRS-80 • R

Percom Data Corporation has one hard disk drive system for just about ALL personal computers ... including of course ... IBM®-PC, APPLE® II, and TRS-80®. Percom Data's innovations with 5¼" Winchester technology mean that for most personal computers ... having a reliable hard disk system is as easy as hooking up a cable.

A Percom Data PHD™ will interface with your present system ... and your future system ... so if you do change computers, you can still keep your most important investment ... your Percom Data Hard Disk Drive.

Because Percom Data helped create the industry standards of today ... new designs in software and hardware will make your selection of a Percom Data Hard Disk Drive pay off tomorrow through system compatibility.

A Percom Data PHD works to capacity because we take the time to correctly develop interface software to your computer which leaves no performance holes for you to fall into. Percom Data knows software functionality is the key to hardware performance.

Today, Percom Data PHD supports a variety of software to match your computer:

IBM®-PC, PC DOS™ 1.1 OR 1.0

CP/M-86®, CONCURRENT CP/M-86™

APPLE®, DOS 3.3, CP/M™

TRS-80® MODELS III & I, DOPLUS, LDOS

IMAGINE ... Percom Data Winchester 5¼" technology ... for today's computers ... and tomorrow's.

To receive an informational booklet describing Percom Hard Disk Systems, or to determine if we have a system for your computer call our **Hard-Line Hot-Line at 1-800-527-1222.**

We will also give you the name of a nearby authorized Percom Data Dealer. Dealer inquiries are welcome.

PERCOM DATA
CORPORATION

Expanding Your Peripheral Vision

DRIVES • NETWORKS • SOFTWARE

(214) 340-7081 • 1-800-527-1222 • TELEX: 73-0401 (PERCOM).

IBM is a registered trademark of International Business Machines. APPLE is a registered trademark of Apple Computer, Inc.
TRS-80 is a registered trademark of Tandy Radio Shack Corp. PHD is a registered trademark of Percom Data Corporation.
COPYRIGHT 1983 PERCOM DATA CORPORATION



The Professional's Editor for Program Development Word Processing Source Code Translations

Widely acclaimed as an editor, VEDIT has evolved to be much more. Only VEDIT offers the combination of a versatile full screen editor integrated with a powerful command language. For the first time you'll be able to perform complex, yet useful, text manipulations that are virtually impossible with other editors or word processors. Plus, its customizability and hardware support ensure that VEDIT will be perfectly matched to your individual needs and to any microcomputer you are ever likely to own.

With two modes of operation, VEDIT never compromises its speed or ease of use for its power and sophistication. As one reviewer (Bradford Thompson, BYTE) wrote: 'If this review gives you an appetite for simplicity while editing, then VEDIT is well worth considering.' Its command language, based on TECO, is virtually a text oriented programming language, allowing command macros to be created, loaded and saved on disk. Yet its simplicity allows even a novice to perform tasks beyond the capabilities of any word processor.

VEDIT cuts programming time in half - with multiple file handling, macro capability and special features for Pascal, PL/1, 'C', Cobol, Assembler and other languages. And it can help with source code translations (example ZILOG to/from INTEL translator macros are included). A complete line of translators will be available by the year's end.

Word processing is a snap with word wrap, paragraph and print functions. Command macros free you from tedious search/replace operations. Hundreds of search/replace on dozens of files can be performed by VEDIT without waiting or intervening.

VEDIT easily configures to your favorite keyboard layout. Use any function or cursor keys you wish. It optimally supports nearly every 8080, Z80 and 8086 computer.

Go ahead and expect a lot from VEDIT. Its performance and our support will satisfy your most exacting needs.

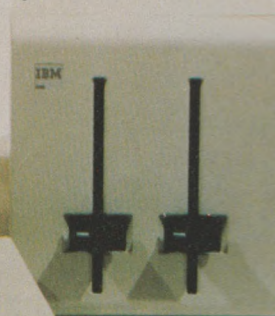
To order, please specify your 8080, Z80 or 8086 microcomputer, operating system and disk format.

COMPARE VEDIT'S FEATURES

- True Full Screen Editing
- Horizontal scrolling
- Edit files one disk in length
- Automatic Disk Buffering
- Compact (only 16K) and Fast
- Display of line and column #
- Set/Goto text markers
- 'Undo' key to restore line
- Automatic Indent/Undent
- Adjustable Tab positions
- Repeat function key
- Text Move and Copy
- 10 Scratchpad Buffers
- Load/Save buffers on disk
- Powerful command macros
- Directory display
- Edit additional (small) files simultaneously
- Insert another disk file
- Unlimited file handling
- Recovery from 'Full Disk'
- Change disks while editing
- Word wrap, format paragraph
- Simple Printing
- 150 page indexed manual
- Startup command file
- Menu driven installation
- Program CRT function keys
- Support newest CRT terminals
- Support smart CRT functions
- Flexible Memory Mapped support
- Customizable keyboard layout

IBM PC, Displaywriter ° Zenith Z100 and Z89 ° NEC APC ° DEC Rainbow and VT180 ° Televideo 802
TRS-80 I, II and 16 ° Xerox 820 ° Apple II Softcard ° SuperBrain ° NorthStar
MP/M ° CP/M-86 ° MP/M-86 ° Concurrent CP/M-86 ° Cromix ° Turbo DOS ° MSDOS ° PC DOS

VEDIT - Disk and Manual
8080, Z80 or IBM PC\$150
CP/M-86 or MSDOS\$195
Manual only\$18



CP/M and MP/M are registered trademarks of Digital Research Inc. Apple II is a registered trademark of Apple Computer, Inc. MS-DOS and Softcard are trademarks of Microsoft. TRS-80 is a trademark of Tandy Corporation. IBM is a trademark of International Business Machines.

CompuView

PRODUCTS, INC.

1955 Pauline Blvd., Suite 200 ° Ann Arbor, Michigan 48103 ° (313) 996-1299

MICROCOMPUTING



Co-operating with your Apple

Page 44.

- 6 Publisher's Remarks
Opportunity's Knockin'
- 8 The Edit Mode
Osborne Corp. Crumbles
- 14 What's New, Big Blue?
PeachText Won't "Ware" Out
- 24 PET-pourri
Writing of Sprytebyter
- 30 Overview
On Top of Trends
- 106 Conversions
- 107 Letters to the Editor
- 120 Micro Software Digest
Software Reviews at a Glance
- 124 Calendar
- 125 Dealer Directory
- 125 Classified Ads
- 126 Book Reviews
- 130 New Software
- 136 New Products
- 146 Software Reviews
A Program for Health Nuts
Final Word in Word Processors?
Reach into Apple's Bag of Tricks

Microcomputing (ISSN 0744-4567) is published monthly by Wayne Green, Inc., 80 Pine St., Peterborough NH 03458. U.S. subscription rates \$25, one year; \$53, three years. Canada and Mexico \$27.97, one year, U.S. funds. Foreign \$44.97, one year; U.S. funds drawn on U.S. bank. Foreign air mail subscriptions—please inquire. Canadian Distributor: Micron Distributing, 409 Queen St. West, Toronto, Ontario, Canada M5V 2A5. South African Distributor: Microcomputing, PO Box 782815, Sandton, South Africa 2146. Second-class postage paid at Peterborough, NH 03458 and at additional mailing offices. Phone: 603-924-9471. Entire contents copyright 1983 by Wayne Green, Inc. No part of this publication may be reprinted or otherwise reproduced without written permission from the publisher. Postmaster: Send form #3579 to *Microcomputing*, Subscription Services, PO Box 997, Farmingdale, NY 11737.

Microcomputing makes every effort to assure the accuracy of articles, listings and circuits published in the magazine. *Microcomputing* assumes no responsibility for damages due to errors or omissions.

38 Cover: Check the Chill

The first in a quartet of innovative applications describes how you can compute the wind chill factor using this Microsoft Basic program.
By Mark Worley

40 Take an Atari and Call Me In the Morning

Help yourself stay healthy by organizing and updating your medical records. By Tim Banse

44 Apples and Food Co-ops? Food for Thought

Micros have a place even in food co-ops, as this Apple program shows.
By Tobi Hoffman

50 A Touch of Braille

This PET program makes learning Braille simple.
By J.J. Hoefer, P.F. Arnold and M.L. Waddell

32 When Apple Gets the (Big) Blues (or, IBM Gets Fruity)

With the program described here, you can have your Apple and IBM shaking hands. By Jurgen Schmidt

56 A Story of Sorts

Sorting on your IBM is less of a chore with this program.
By Mark Johansen

60 Moore on the H120: A New Generation

Part 2 of the author's H120 review describes the features of Heath's latest. By Martin Moore

66 The MPF-II: An Apple Alternative?

The Apple-compatible Micro-Professor leads the Chinese Invasion.
By Tim Daniel

70 The T/S 1000: Make it on a Monitor

The author's hardware project makes your T/S 1000/ZX-81 monitor-compatible.
By Sharon Zardetto Aker

72 Kaypro's Mega-Memory

Ten megabytes of memory may make the Kaypro 10 the leader in the portable field. By Bob Hickey

78 Satisfying Your Lust for Memory

Adding memory to your S-1000 bus computer doesn't have to bust your bank account. By John Uffenbeck

85 Sorts Illustrated

Get started on sorting methods with this how-to article. By Dick Lutz

96 The Low-Down on Downloading

If you're having trouble downloading Basic to your C-64, you'll find the answer here.
By Michael Fichtelman

100 The Intelligent Toaster

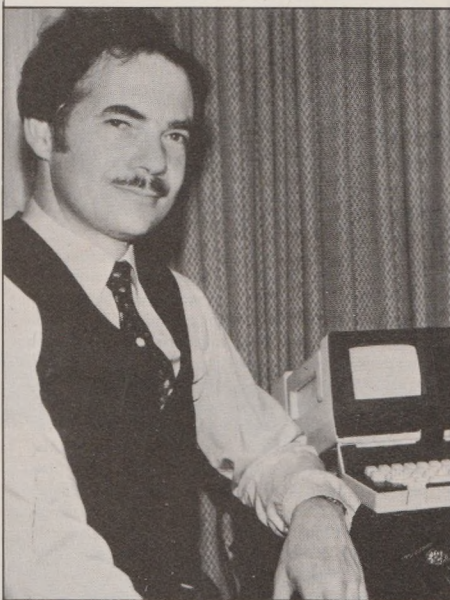
The author describes construction of the Command Communicator—an integral part of the home control system. By Mark Robillard

108 Buyer's Guide to \$4000-\$6000 Systems

Part 4 in this series of buyer's guides helps you choose the right system.

In Case You Noticed . . .

No, we didn't really have two No. 9s. Last month's *Microcomputing* was incorrectly labeled "Volume VII No. 9." For the record, it should have been "Volume VII No. 10." We regret the error.



The fall of Adam.

Page 8.

Cover photo by Frank Cordelle.

PRESIDENT/PUBLISHER/EDITOR

Wayne Green

VICE PRESIDENT/GENERAL MANAGER

Debra Wetherbee

EDITORIAL MANAGER

Jeff DeTray

VICE-PRESIDENT/FINANCE

Roger Murphy

ASSISTANT TO THE PRESIDENT/VP

Matthew Smith

ASSISTANT TO THE VP/FINANCE

Dominique Smith

DIRECTOR OF MARKETING & SALES

David Schissler

CIRCULATION DIRECTOR

Bill Howard

603-924-9471

BULK AND NEWSSTAND SALES MANAGER

Ginnie Boudrieau

1-800-343-0728

ADVERTISING SALES MANAGER

Giorgio Saluti

ADVERTISING

603-924-7138

Bob Sharkey, Judi Wimberly

PUBLIC RELATIONS

Jim Leonard

PRODUCTION MANAGER

Nancy Salmon

ASSISTANT TO THE PRODUCTION MANAGER

David Wozmak

ADVERTISING PRODUCTION

Bruce Hedin

PRODUCTION DEPARTMENT

Patricia Bradley, Fiona Davies, Linda Drew,
Michael Ford, Marjorie Gillies, Kimberly Nadeau,
Scott Philbrick, Paula Ramsey, Lynne Simonson,
Ken Sutcliffe, Karen Wozmak

FILM PRODUCTION

Theresa Verville, Donna Hartwell, Robert Villeneuve

PHOTOGRAPHY

Thomas Villeneuve, Sandra Dukette, Nathaniel Haynes,
Laurie Jennison, Sturdy Thomas

TYPESETTING

Sara Bedell, manager; Darlene Bailey,
Prem Krishna Gongaju, Lynn Haines,
Cynthia Letourneau, Lindy Palmisano, Heidi Thomas,
Michael Thompson, Sue Weller

DESIGN DIRECTOR

Christine Destremes

DESIGN

Joyce Pillarella, supervisor; Susan Donohoe,
Holly Fuetter, Howard Happ, Beth Krommes,
Dion Owens, Dianne Ritson, Patrice Scribner,
Susan Stevens, Suzanne Torsheya, Sarah Werninger,
Donna Wohlfarth

Microcomputing is certified by the
Audit Bureau of Circulations.



Microcomputing is a member of the CW Communications/Inc. group, the world's largest publisher of computer-related information. The group publishes 42 computer publications in 18 major countries. Nine million people read one or more of the group's publications each month. Members of the publication group include: Australia: *Australasian Computerworld*, *Micro Magazine*; Argentina: *Computerworld/Argentina*; Brazil: *DataNews*, *MicroMundo*; Denmark: *Computerworld/Danmark*, *MikroData*; France: *Le Monde Informatique*; Germany: *ComputerWoche*, *MicroComputerWelt*, *PC Welt*; Italy: *Computerworld Italia*; Japan: *Computerworld Japan*; Mexico: *Computerworld/Mexico*; Norway: *Computerworld Norge*, *MikroData*; People's Republic of China: *China Computerworld*; Saudi Arabia: *Saudi Computerworld*; Spain: *Computerworld/Espana*, *MicroSistemas*; Sweden: *ComputerSweden*, *MikroDatorn*, *Min Hemdator*; United Kingdom: *Computer Management*, *Computer Business Europe*; United States: *Computerworld*, *Desktop Computing*, *HOT CoCo*, *inCider*, *InfoWorld*, *ISO World*, *Microcomputing*, *PC World*, *80 Micro*, *RUN*.

PUBLISHER'S REMARKS

By
Wayne Green

"How to Succeed . . ."



That Din? It's Opportunity Trying To Break Down Your Door!

Yep, here we are in a new industry, one which has been growing at about 250 percent a year since it started nine years ago. We've watched with awe as millionaires sprouted on all sides. Oh, we've also watched some spectacular debacles, such as Pertec, Imsai, Processor Tech and now Osborne.

But you know, for every high flier like Apple, there have been maybe a thousand smaller firms that have gotten into the business and done nicely. This is where the real opportunities lie. Just look at the less-than-full-page ads in the 187 magazines now in the field. Just look at the row after row of smaller booths at the multitude of micro shows—at least one almost every week of the year now.

For all of the fuss and media attention given to Atari, Texas Instruments, Mattel and Timex and their miseries, the real news as far as I'm concerned is the health of the thousands of smaller businesses that the industry has spawned. And if you think that it's too late, it isn't. The gold rings are still out there to be grabbed.

For instance, in most industries there are thousands of manufacturer's representatives. These people act as salespersons in local areas for a manufacturer. Reps, for the most part, do well, usually sporting BMWs or Mercedes. The micro industry grew up so fast that reps have yet to really get going.

With some 450 different manufacturers of microcomputer systems, all in desperate need of reps to see that their equipment is being sold in the thousands of stores now selling computers, that business opportunity is wide open. And, boy, does it pay!

The rep with only about 20 stores to handle—and a good rep should be able to service more like 100—and whose stores are selling only one crummy computer system each per week, which is not much these days, would stand to gross around \$20,000 a month. That's figuring a wholesale price of only \$2500 per system and the normal ten percent commission.

Get Hustlin'

So there's an opportunity for some 10,000 people to get hustling and make around \$250,000 a year on the average. Nice tidy bundle. And if you add in some smaller lines of software, accessories, magazines and books, whew! You're looking right at a million dollars a year in sales.

Each computer store offers either full- or part-time opportunities in sales or service, or in helping with other functions, such as advertising and promotion, programming, bookkeeping, information-gathering and so on.

The magazine and book departments of these stores can be enormous profit centers, but they need attention. A sharp person might contract out to see that the library sections of several computer stores are kept in stock and that the best-selling books are featured. Store managers normally don't have the time to do this right, and thus they can lose tens of thousands of dollars in profits.

New businesses have several potential goals. One is just to provide a nice income for you—such as with repping. Another is to aim toward high growth with an eye toward eventually going public, selling out for big bucks, or just getting bigger.

If you would like to get into business, but can't think of an accessory to make and sell, can't work up some programs to sell, or can't write books, perhaps you can scout around the Asian electronic shows and find some unusual products to import and sell by mail order. The Asian consumer electronics shows are about the only place you can meet the thousands of small businesses and find these products.

Taiwan is a treasure trove of mail order

(Continued on p. 8)

"Why Do I Love To Drive My 380ZTM?"

"It's Got A
48K Buffer

Goes
0 to 200 W.P.M.

Is A
Daisy Wheel Printer

And
The Price Is Right"

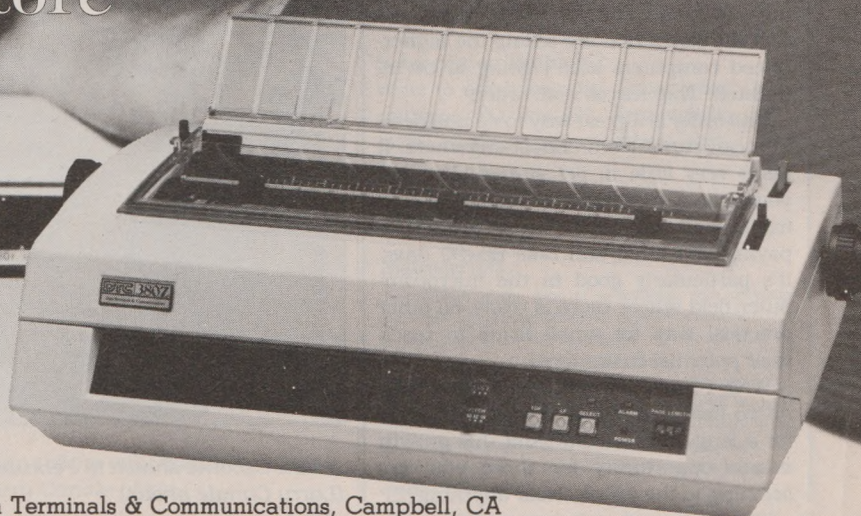
- Compatible with your personal computer
- Most complete word processing & graphics
- Forms tractor & auto sheet feeder
- Now with more capabilities

"Test Drive One At
Your Computer Store"

Circle 310 on Reader Service card.



Data Terminals & Communications, Campbell, CA
800-962-8185 • In CA 800-538-9294 • Dealer & Distributor Inquiries Welcome



ideas. I've found some great paper holders for printers, cable guides, blowers to keep systems cool and all sorts of accessories for the Apple and other systems.

Each new computer that looks as if it is going to sell in the hundreds of thousands presents a golden opportunity to make money. Be sure that the system is supported by a magazine that is going to reach the owners so you will have a way to sell what you make. Then it's a matter of deciding whether you are going to sell software, accessories or information.

The Timex/Sinclair 1000 looked like a wonderful opportunity at first because it was widely advertised and sold. However, Timex refused to cooperate with any publishers, so there was no magazine—and soon there were few Timex sales. A good third-party-run magazine could have saved Timex hundreds of millions of dollars.

A magazine can help new owners of a computer to get over the early hurdles. This was of particular importance with the Timex computer because it was so inexpensive that people tended to get discouraged and just throw it into a drawer and forget it. A more expensive computer might be just as frustrating, but would command more effort because of the cost. A magazine might have solved this problem and helped to keep the T/S 1000 a best seller.

Customer disillusionment is an expensive miser. Timex owners who got fed up trying to cope with their computers not only threw them into drawers, but they also explained to anyone who would listen what a turkey computer it was. Then friends told friends, and Timex sales dropped off the bottom of the charts.

Listen...

My warning, then, is simple: If there is no magazine—and I mean a good one with a substantial firm behind it—beware. The mass selling computers can be a wonderful bonanza for you, but only if you can reach the owner. You're not going to be able to get your stuff into the thousands of discount stores that are selling computers, and you know as well as I that the stores that are selling the higher-priced computers aren't going to be interested. That leaves mail order.

Mail order is a great way to do business. You can run it from almost anywhere. It takes very little to get started. You get your money right up front instead of having to wait for dealers to get around to paying you—that can take 60–90 days. It's particularly good in the microcomputer field where there is really no other practical way for small firms to reach their potential customers.

Well, I hope the message is clear. The micro field is going to continue to grow for a long time to come and this growth means opportunity for those who are listening to the knock. Hear anything? □

THE EDIT MODE

By Larry Canale

Osborne Goes Under

"Adam Osborne was sitting on the only real portable, but he blew it," mused author/entrepreneur Jake Commander.

Commander was referring to an Osborne portable that didn't quite make it out the door. It had a working title of the "Vixen," and it was so close to being released that, in February, Osborne went on a personal PR campaign to stir up interest in that new portable, as well as in the Executive.

Now, with the September 13 bankruptcy—Chapter 11 debt reorganization—of Osborne Computer Corp., the Vixen, barring any unforeseen and shocking developments, will never see the light of day.

Private Preview

Adam Osborne was feeling confident on the day of the private preview he held for *Microcomputing* on February 17. In fact, he was almost smug, exchanging jokes in his British accent with fellow Englishman Commander, then MC's tech editor. We could see why—he showed us the Executive I (see *Microcomputing*, May 1983, p. 60) and then proudly unveiled the Vixen.

Commander was almost as excited about the Vixen as Osborne was.

"I thought it looked more like a portable than the Osborne 1, which was really a transportable," Commander said. "I swear that the girl in the original ad must have had one arm longer than the other after carrying the Osborne 1. The Vixen

was something that wouldn't kill you to carry.

"I thought the Vixen was it," Commander said. "If Osborne could have gotten it out, it would have made a killing. It was great—it had two disks and a real keyboard, and the screen was very clear and readable. The one we saw had a five-inch screen, but Osborne said he'd fit a seven-inch screen in there if it took a jar of vaseline.

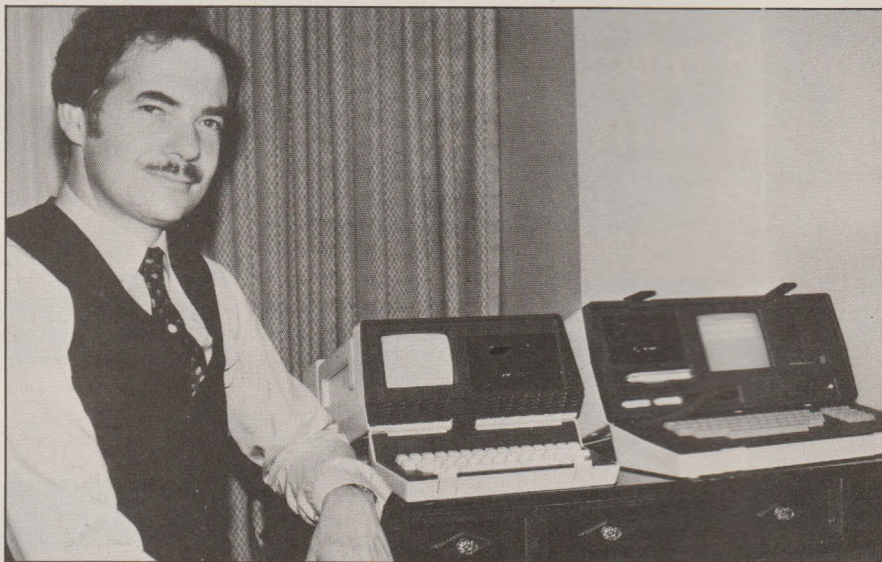
"It was a machine whose time had come," Commander added.

Osborne's previews of the Vixen proved too early. It needed more work, so Osborne Corp., protected by a nondisclosure, asked *Microcomputing* to hold off on news of the Vixen until it was ready. We complied, as did other magazines asked to do so.

The Executive, at least, was released, and that alone made sales of the Osborne 1 drop. But before Executive I sales could take off, news of the Executive II—which would offer compatibility with the IBM PC—leaked out. That strangled sales of the Executive I, and when the II's release date was delayed, Osborne had little incoming cash.

Nothing New?

"With the Executive I, Osborne was doing something he'd already done," Commander said. "He failed to build on something he started, and you can't backtrack—this business moves too fast.



Adam Osborne shown in February 1983 with the "Vixen" (left) and the Executive I. (Larry Canale photo.)

The Vixen, though, would have slayed competition."

Paul Freiberger, senior editor of *Info-world*, believes that the delay in the Vixen's release is overrated as a cause of Osborne's troubles. Several factors contributed, he said, including "marketing errors—especially those since the beginning of this year, which coincides with the time Osborne brought in so-called professional managers."

Freiberger also cited "delays in announcing new products" as part of the problem. In addition, he said, "It hurt them to continue selling only Osborne new products."

Whether Osborne's Chapter 11 bankruptcy will mark the start of an industry-wide shake-out remains to be seen. Several manufacturers of micros, including Altos Computer Systems, Fortune Systems, Vector Graphics and Victor Technologies, are feeling the squeeze. And, according to *The New York Times*, Osborne's bankruptcy is the "first failure in what analysts see as a developing shake-out in the glutted personal computer industry."

In Osborne's case, creditors pursuing some \$45 million in debts were breathing down Osborne's back; the company's assets were estimated at \$40 million. More than 80 percent of the company's 350-plus employees were laid off the week of the bankruptcy filing, but Osborne announced that it would continue sales and service of existing products and that it would support development of new products.

No Reply

Requests for further information from the Hayward, CA, firm brought the reply,

"Other than what was said in the announcements, the company has no further comment."

Chances of Osborne being bought out by another firm are slim. Early on, there were rumors of a bailout by ITT Corp., NCR Corp. or Japanese or French companies, but they didn't pan out.

Several factors are blamed for Osborne's demise. Osborne himself is one of the factors; he's a highly rated innovator and designer, but he's not noted for having a whole lot of business savvy.

Other reasons include Osborne Corp.'s weakness in management and marketing. Premature announcements of the Executive machines hurt, and so did leaks of the Vixen's development.

In addition, the feeling of complacency that Osborne seemed to have was a factor. After the instant success of the Osborne 1, the company concentrated on that product; when the rest of the industry caught on and improved on that portable, Osborne took too long to come back.

Osborne Computer Corp. may be gone for good, but don't write off Adam Osborne.

"I wouldn't count him out," Freiberger said. "He'll still pull a rabbit out of his hat."

"I think Adam will bounce back—maybe not with Osborne, but with another company," Dan Sullivan, editor of *Desktop Computing*, said. "He's a born entrepreneur. He'll be back."

On the Cover

What does this month's cover have to do with the price of eggs? Well, one of this month's articles focuses on using an Apple to manage a food co-op. The article, "Apples and Food Co-ops? Food for

MICROCOMPUTING

Editorial Offices
80 Pine St.
Peterborough, NH 03458

EDITOR-IN-CHIEF

Keith Thompson

SENIOR EDITORS

Dan Muse, Larry Canale

ASSISTANT EDITORS

Tracy Mayor, Sheila Wright

TECHNICAL EDITOR

Jim Heid

PRODUCTION EDITORS

Susan Gross, Judy Oliver

LAYOUT EDITORS

Joan Ahern, Bob Dukette, Phil Geraci,
Maurelle Godoy, Sue Hays, Laura Landy

EDITORIAL ADMINISTRATION

Jill Hall

PROOFREADER

Harold Bjornsen

ASSOCIATE EDITORS

Robert Baker, Thomas Bonoma,
Frank Derfler, Jr.

Subscription Info

Write to *Microcomputing*, Subscription Department, PO Box 997, Farmingdale, NY 11737. For renewals and changes of address, include the address label from your most recent issue of *Microcomputing*. For gift subscriptions, include your name and address as well as those of gift recipients. Postmaster: Send form #3579 to *Microcomputing*, Subscription Services, PO Box 997, Farmingdale, NY 11737.

Subscription Problem?

Write to *Microcomputing*, Subscription Department, PO Box 997, Farmingdale, NY 11737. Please include an address label.

Manuscripts

Contributions in the form of manuscripts with drawings and/or photographs are welcomed and will be considered for possible publication. We can assume no responsibility for loss or damage to any material. Please enclose a self-addressed, stamped envelope with each submission. Payment for the use of any unsolicited material will be made upon acceptance. All contributions should be directed to the *Microcomputing* editorial office (Pine St., Peterborough, NH 03458). "How to Write for *Microcomputing*" guidelines are available upon request.



Jake Commander, ex-technical editor for MC, gets some of the only hands-on experience with the "Vixen." At left is Adam Osborne. (Larry Canale photo.)



The Chaplin character licensed by Bubbles, Inc., S.A.

Congratulations. We published your program.

The envelope, please.

There's an acceptance letter inside. And a check that could have your name on it. (If we select your program, that is.)

But remember.

We pick our winners carefully.

Because the software we publish for the IBM Personal Computer has to be good enough to complement IBM Personal Computer hardware. (See the box at right.)

Like our hardware, this software should be simple to use. Friendly. Fast. And written to help satisfy the needs of the individual.

Our Personal Editor is a perfect example. A versatile text file editor, it not only helps the user save time, but lets him easily self-tailor a task with definable function keys. And it sets a standard of excellence.

Of course, every person will use the IBM Personal Computer differently. That's why we plan on publishing many different programs.

Entertainment programs.
And educational programs. And
business programs. And
personal productivity

programs. And graphics. And games.
And more.

We'll also consider software written by programmers *for* programmers. For example, the BASIC Program Development System, Professional Editor and Diskette Librarian

IBM PERSONAL COMPUTER SPECIFICATIONS

User Memory 64K-640K bytes	Display Screens Color or monochrome High-resolution 80 characters x 25 lines Upper and lower case	Permanent Memory (ROM) 40K bytes
Microprocessor 16-bit, 8088		Color/Graphics <i>Text mode:</i> 16 colors 256 characters and symbols in ROM
Auxiliary Memory 2 optional internal diskette drives, 5 1/4" 160KB/180KB or 320KB/360KB per diskette	Operating Systems DOS, UCSD p-System, CP/M-86+	Graphics mode: 4-color resolution: 320h x 200v Black & white resolution: 640h x 200v Simultaneous graphics & text capability
Keyboard 83 keys, 6 ft. cord attaches to system unit 10 function keys 10-key numeric pad	Languages BASIC, Pascal, FORTRAN, MACRO Assembler, COBOL	Communications RS-232-C interface SDL/C, Asynchronous, Bisynchronous protocols Up to 9600 bits per second
Diagnostics Power-on self testing Parity checking	Printer All-points-addressable graphics capability Bidirectional 80 characters/second 18 character styles 9 x 9 character matrix	

are high-quality, full-function tools that were submitted by authors like you and subsequently published by us.

Now you might have the chance to win.

Who knows? You could open the mailbox and find one of the envelopes shown here.

For information on how to submit your program, if completed and running, write:
IBM Personal Computer External Submissions,
Dept. 765 PC, Armonk,
New York 10504.



The IBM Personal Computer A tool for modern times

Circle 285 on Reader Service card.

Thought," offers a program designed to make co-op management a piece of cake.

Our November issue also presents three other articles that deal with unusual and imaginative applications. "Check the Chill" describes how to use your micro to calculate the wind chill factor. The author's Microsoft program answers the magical question, "But how cold is it with the wind chill?"

"Take an Atari and Call Me in the Morning" explains how to use a micro to keep track of vital medical information for you and your family. In time of emer-



gency, you may not remember who is allergic to what, but with this program, your Atari will be ready to cough up the pertinent medical records.

Although these articles may not be of interest to everyone, they demonstrate a change in the way microcomputers can be used. Sure, you still want VisiCalc and WordStar, but micro applications are becoming more creative and personal.

The uses for your micro are limited only by your imagination. Even if you've been contemplating learning to write in braille, this issue has you covered. □

A Call to Authors . . .

If you have been a reader of *Microcomputing* for some time, you probably know that we rely on you, the reader, to provide articles.

Remember, *Microcomputing* readers are a lot like you—interested in the more advanced, intermediate level of computing. *Microcomputing* readers want to know about peripherals and applications software. They want reviews of the newest systems, hardware and software.

We are also looking for articles that cover specific topics. Upcoming issues of *Microcomputing* will focus on computers in sports, information networks, computer homes, robotics and laser disks.

We invite you to submit your article or article proposal to *Microcomputing*, Submissions Editor, 80 Pine St., Peterborough, NH 03458. Our brochure, "How to Write for *Microcomputing*," is available upon request.

Sneak Previews

You won't want to miss the December issue of *Microcomputing*. We'll be concentrating on using your microcomputer for real estate management, in addition to many other informative articles.

Our Rental Analysis program will help you manage real estate rental property by computing monthly mortgage, recommended rent, monthly expenses, tax savings and return on investment. Our real estate investment analysis article offers a comprehensive "what-if" program that will analyze various rates of financing, inflation, depreciation and tax, letting you analyze many scenarios in real time. It makes it easy to compare real estate alternatives.

We'll also review the Eagle PC and Eagle 1600 series. The review will compare four Eagles feature-by-feature. Eagle has made a strong statement in the microcomputer marketplace. This review tells why.

In our Software Reviews section, we'll take a comprehensive look at the Next Step, a program that creates database management and data reporting programs for the IBM PC. If you're involved in any type of inventory control, you'll want to read all about Infotory, an inventory management system.

As usual, Frank Derfler's "Overview" column will take a look at what's new in the industry. Thomas Bonoma will cover the month's IBM developments, and Robert Baker will give insight into the Commodore marketplace.

Circle 389 on Reader Service card.

Introducing the Creative Genius . . .

YOU.

You have the system . . . and now you have the means.

DataBurst™, a genuine full-screen processor with a BASIC program generator, brings mainframe technology to your IBM®-PC. The unique DataBurst™ screen editor allows you to design screen formats quickly and easily. Screen formats are program-independent, reducing both development and maintenance time.

During execution of your BASIC program, DataBurst™ will handle all of your screen and keyboard operations through one Assembly language module, which requires less than 12K of RAM. A true full-screen processor, DataBurst™ allows unlimited design complexity, turning every programmer into a 'creative genius'.

For your convenience, DataBurst™ is available through your local computer retailer or directly from Key Solutions, Inc. To order directly, please send check or money order for \$225.00 to Key Solutions, Inc., P.O. Box 2297, Santa Clara, CA 95055 (California residents add applicable sales tax).

IBM®-PC is a registered trademark of International Business Machines Corporation.
DataBurst™ is a trademark of Key Solutions, Inc.



**The Design Tool for the
Creative Programmer**

**KEY
SOLUTIONS™**

Z80 Software

SOFTWARE DESCRIPTIONS

TPM (TPM I) - \$80 A Z80 only operating system which is capable of running CP/M programs. Includes many features not found in CP/M such as independent disk directory partitioning for up to 255 user partitions, space, time and version commands, date and time, create FCB, chain program, direct disk I/O, abbreviated commands and more! Available for North Star (either single or double density), TRS-80 Model I (offset 4200H) or II, Versafloppy I, or Tarbell I.

TPM-II - \$125 An expanded version of TPM which is fully CP/M 2.2 compatible but still retains the extra features our customers have come to depend on. This version is super FAST. Extended density capability allows over 600K per side on an 8" disk. Available preconfigured for Versafloppy II (8" or 5"), Epson QX-10, Osborne II or TRS-80 Model II.

CONFIGURATOR I

This package provides all the necessary programs for customizing TPM for a floppy controller which we do not support. We suggest ordering this on single density (8SD).

Includes: TPM-II (\$125), Sample BIOS (BIOS) SOURCE (SFREE), MACRO II (\$100), LINKER (\$80), DEBUG I (\$80), QED (\$150), ZEDIT (\$50), TOP I (\$80), BASIC I (\$50) and BASIC II (\$100)

\$815 Value **NOW \$250**

CONFIGURATOR II

Includes: TPM-II (\$125), Sample BIOS (BIOS) SOURCE (SFREE), MACRO II (\$100), MACRO III (\$150), LINKER (\$80), DEBUG I (\$80), DEBUG II (\$100), QAL (\$200), QED (\$150), ZTEL (\$80), TOP II (\$100), BUSINESS BASIC (\$200) and MODEM SOURCE (\$40) and DISASSEMBLER (\$80)

\$1485 Value **NOW \$400**

MODEL I PROGRAMMER

This package is only for the TRS-80 Model I. Note: These are the ONLY CDL programs available for the Model I. It includes: TPM I (\$80), BUSINESS BASIC (\$200), MACRO I (\$80), DEBUG I (\$80), ZDDT (\$40), ZTEL (\$80), TOP I (\$80) and MODEM (\$40)

\$680 Value **NOW \$175**

MODEL II PROGRAMMER

This package is only for the TRS-80 Model II. It includes: TPM-II (\$125), BUSINESS BASIC (\$200), MACRO II (\$100), MACRO III (\$150), LINKER (\$80), DEBUG I (\$80), DEBUG II (\$100), QED (\$150), ZTEL (\$80), TOP II (\$100), ZDDT (\$40), ZAPPLE SOURCE (\$80), MODEM (\$40), MODEM SOURCE (\$40) and DISASSEMBLER (\$80)

\$1445 Value **NOW \$375**

BASIC I - \$50, a 12K+ basic interpreter with 7 digit precision.

BASIC II - \$100, A 12 digit precision version of Basic I.

BUSINESS BASIC - \$200, A full disk extended basic with random or sequential disk file handling and 12 digit precision (even for TRIG functions). Also includes PRIVACY command to protect source code, fixed and variable record lengths, simultaneous access to multiple disk files, global editing, and more!

ACCOUNTING PACKAGE - \$300, Written in Business Basic. Includes General Ledger, Accounts Receivable/Payable, and Payroll. Set up for Hazeltine 1500 terminal. Minor modifications needed for other terminals. Provided in unprotected source form.

MACRO I - \$80, A Z80/8080 assembler which uses CDL/TDL mnemonics. Handles MACROs and generates relocatable code. Includes 14 conditionals, 16 listing controls, 54 pseudo-ops, 11 arithmetic/logical ops, local and global symbols, linkable module generation, and more!

MACRO II - \$100, An improved version of Macro I with expanded linking capabilities and more listing options. Also internal code has been greatly improved for faster more reliable operation.

MACRO III - \$150, An enhanced version of Macro II. Internal buffers have been increased to achieve a significant improvement in speed of assembly. Additional features include line numbers, cross reference, compressed PRN files, form feeds, page parity, additional pseudo-ops, internal setting of time and date, and expanded assembly-time data entry

DEVELOPER I

Includes: MACRO I (\$80), DEBUG I (\$80), ZEDIT (\$50), TOP I (\$80), BASIC I (\$50) and BASIC II (\$100)

\$440 Value **NOW \$150**

DEVELOPER II

Includes: MACRO II (\$100), MACRO III (\$150), LINKER (\$80), DEBUG I (\$80), DEBUG II (\$100), BUSINESS BASIC (\$200), QED (\$150), TOP II (\$100), ZDDT (\$40), ZAPPLE SOURCE (\$80), MODEM SOURCE (\$40), ZTEL (\$80), and DISASSEMBLER (\$80).

\$1280 Value **NOW \$350**

DEVELOPER III

Includes: QAL (\$200), QED (\$150), BUSINESS BASIC (\$200), ZTEL (\$80) and TOP II (\$100)

\$730 Value **NOW \$300**

COMBO

Includes: DEVELOPER II (\$1280), ACCOUNTING PACKAGE (\$300), QAL (\$200) and 6502X (\$150)

\$1930 Value **NOW \$500**

LINKER - \$80, A linking loader for handling the linkable modules created by the above assemblers.

DEBUG I - \$80, A tool for debugging Z80 or 8080 code. Disassembles to CDL/TDL mnemonics compatible with above assemblers. Traces code even through ROM. Commands include Calculate, Display, Examine, Fill, Goto, List, Mode, Open File, Put, Set Wait, Trace, and Search.

DEBUG II - \$100, A superset of Debug I. Adds Instruction Interpreter, Radix change, Set Trap/Conditional display, Trace options, and Zap FCB.

6502X - \$150, A 6502 cross assembler. Runs on the Z80 but assembles 6502 instructions into 6502 object code! Similar features as our Macro assemblers.

QAL - \$200, A SUPER FAST Z80 assembler. Up to 10 times faster than conventional assemblers. Directly generates code into memory in one pass but also to offset for execution in its own memory space. Pascal like structures: repeat, until, if, then, else, while, do, begin, end, case, of. Multiple statements per line, special register handling expressions, long symbol names, auto and modular assembly, and more! This one uses ZILG Mnemonics.

QED - \$150, A screen editor which is both FAST and easy to learn. Commands include block delete, copy, and move to a named file or within text, repeat previous command, change, locate, find at start of line, and numerous cursor and window movement functions. Works with any CRT having clear screen, addressable cursor, clear to end of line, clear to end of screen, and 80X24.

DISK FORMATS

When ordering software specify which disk format you would like.

CODE	DESCRIPTION
8SD	8" IBM 3740 Single Density (128 bytes/26 sectors/77 tracks)
8DD	8" Double Density (256 bytes/26 sectors/77 tracks)
8XD	8" CDL Extended Density (1024 bytes/8 sector/77 tracks 616K)
5SD	5.25" Single Density (TRS80 Model I, Versafloppy I, Tarbell I)
5EP	5.25" Epson Double Density
5PC	5.25" IBM PC Double Density
5XE	5.25" Xerox 820 Single Density
5OS	5.25" Osborne Single Density
5ZA	5.25" Z80 Apple (Softcard compatible)
TPM INFO	When ordering TPM I or II, in addition to Disk Format, please specify one of the following codes:
CODE	DESCRIPTION
TPM I:	
NSSD/H	North Star Single Density for Horizon I/O
NSSD/Z	North Star Single Density for Zapple I/O
NDDH/H	North Star Double Density for Horizon I/O
NDDZ/Z	North Star Double Density for Zapple I/O
TRS80-I	TRS-80 Model I (4200H Offset)
TRS80-II	TRS-80 Model II
VI8	Versafloppy I 8"
VI5	Versafloppy I 5.25"
TPM-II:	
VII8	Versafloppy II 8" (XD)
VII5	Versafloppy II 5.25"
TRS80-II	TRS-80 Model II (XD)

Prices and Specifications subject to change without notice.
TPM, Z80, CP/M, TRS80 are trademarks of CDL, Zilog, DRI and Tandy respectively.

ZTEL - \$80, An extensive text editing language and editor modelled after DEC's TECO.

ZEDIT - \$50, A mini text editor. Character/line oriented. Works well with hardcopy terminals and is easy to use. Includes macro command capability.

TOP I - \$80, A Text Output Processor for formatting manuals, documents, etc. Interprets commands which are entered into the text by an editor. Commands include justify, page number, heading, subheading, centering, and more.

TOP II - \$100, A superset of TOP I. Adds: embedded control characters in the file, page at a time printing, selected portion printing, include/merge files, form feed/CRLF option for paging, instant start up, and final page ejection.

ZDDT - \$40, This is the disk version of our famous Zapple monitor. It will also load hex and relocatable files.

ZAPPLE SOURCE - \$80, This is the source to the SMB ROM version of our famous Zapple monitor. It can be used to create your own custom version or as an example of the features of our assemblers. Must be assembled using one of our assemblers.

MODEM - A communication program for file transfer between systems or using a system as a terminal. Based on the user group menu but modified to work with our SMB board or TRS-80 Models I or II. You must specify which version you want.

MODEM SOURCE - \$40, For making your own custom version. Requires one of our Macro Assemblers.

DISASSEMBLER - \$80, Does bulk disassembly of object files creating source files which can be assembled by one of our assemblers.

HARDWARE

S-100 — **SMB II Bare Board \$50**, "System Monitor Board" for S-100 systems. 2 serial ports, 2 parallel ports, cassette interface, 4K memory (ROM, 2708 EPROM, 2114 RAM), and power on jump. When used with Zapple ROM below, it makes putting a S-100 system together a snap.
Zapple ROM \$35, Properly initializes SMB I/II hardware, provides a powerful debug monitor.

IBM PC — **Big Blue Z80 board \$595**, Add Z80 capability to your IBM Personal Computer. Runs CP/M programs but does not require CP/M or TPM. Complete with Z80 CPU, 64K add on memory, serial port, parallel port, time and date clock with battery backup, hard disk interface, and software to attach to PC DOS and transfer programs. Mr'd by QCS.
50% Discount on all CDL software ordered at the same time as a Big Blue (and for the Big Blue).

APPLE II — **Chairman Z80 \$345**, Add Z80 capability to your Apple II/II Plus computer. Runs CP/M programs with our more powerful TPM. Includes 64K memory add on (unlike the competition this is also useable by the 6502/DOS as well as the Z80), TPM, QAL assembler, QED Screen Editor, and Business Basic. Mr'd by AMT Research.
Apple Special \$175, Buy the Apple Z80 Developer at the same time as the "Chairman" and pay only \$175 instead of \$325.

APPLE Z80 DEVELOPER

Includes: 6502X (\$150), MACRO II (\$100), MACRO III (\$150), QAL (\$200), QED (\$150), LINKER (\$80), DEBUG I (\$80), DEBUG II (\$100), ZDDT (\$40) and BUSINESS BASIC (\$200)

VALUE: \$1250 **NOW \$325**

\$175 when purchased with AMT "Chairman" Board

ORDERING INFORMATION:

VISA/MasterCard/C.O.D.

Call or Write With Ordering

Information....



OEMS:

Many CDL products are available for licensing to OEM's. Write to Carl Galletti with your requirements.

Dealer Inquiries Invited.

For Phone Orders ONLY Call Toll Free...
1-(800) 458-3491 (Except Pa.)

Ask For Extension #15

For information and Tech Queries call
(609) 599-2146

Computer Design Labs

342 Columbus Avenue/Trenton, NJ 08629



A Peachy WP Package

PeachText: The Epitome Of Integration

Getting Personal

Let's start this month with the integrated software package on which I'm composing this column—PeachText 5000.

PeachText 5000, for those of you who are as old as I am, *seems* to consist of the following:

- The Magic Wand word processor;
- Its associated spelling checker;
- The Random House thesaurus;
- A variant of SuperCalc;
- A list-type filing program called List Manager. I say "seems" because it is impossible to be sure in this business if software that *looks* like SuperCalc is indeed SuperCalc. Sure does look like it, though.

The software is called from a common menu, is partially integrated and allows you to do a variety of tasks from within a single shell. It's also, rumor has it, selling like hotcakes, so we'd better take a thorough look.

New Magic From Old Friends

The PeachText word processor (Magic Wand) is an old one in microcomputer terms, dating from the late 70s. It also used to be one of the best text postprocessors around.

Just Peachy

PeachText is a full-fledged word processor, supporting an editor with numerous embedded commands (justification, text-positioning, forms-control and the like), proportional print wheels on daisy wheel printers, spool printing (printing one file while editing another), boilerplate paragraph insertions/manipulation and a host of other features.

Unlike some of the newer word processors, it isn't a what-you-see-is-what-you-get editor; rather, you enter the commands and text in an edit file, and PeachText processes it, much like The Final Word or PIE Writer, to give you your output. You can preview formatted output on the screen, though.

PeachText uses some function keys and has been semi-integrated with the PC; however, it does only a marginal job at taking advantage of the PC's abilities, and it's not a word processor you sit down with for a single evening to achieve proficiency.

Like The Final Word, PeachText claims a learning price to proficiency, especially in its more advanced reaches. For example, manipulating variables and data files (there is capability for relatively complete "mail-merge" manipulation) for form letters takes some learning.

As you've guessed, I'm not taken by the cursor movement keys in PeachText. For instance, although there are commands for movement to top and bottom of text, there's no moving by sentences or moving forward or backward by words. And, the block commands (block extract, block move, even block delete) require "escaping" from the document to the edit status screen before they can be used. In fact, many of the keypad editing keys are unused and useless in PeachText. That's one of the consequences of a 1970s program; it's not debilitating—just less than adequate.

PeachText's spelling checker, in my mind, is competent, but nothing to write home about. First, it isn't interactive. You need to save your file, go to the main menu, choose "spell," check the file, review the words, mark them, go back into the editor, find the marks and fix them. It's not well-integrated; it doesn't fix words that are wrong and it doesn't show them in sentence context like some of the better checkers. The nicest feature of the word processing/spelling package is the thesaurus, an on-line and integrated invention that you call by hitting function key 10 with the cursor on the word for which you'd like a synonym.

Say you need a synonym for the word "want" in this sentence. Put the cursor on the w and hit F10. The bottom half of the screen displays: "want (v.)—need, desire, lack..." Move the cursor to the

word you wish to substitute for "want" (in this case, I chose "need") and hit return... *viola!*

Unfortunately, you can't add words to the thesaurus, which is understandable, but sad. Worse, the thesaurus in its current form recognizes only a limited number of words, and it can't handle either plurals or suffixes.

PeachCalc—Super?

PeachText's PeachCalc is indistinguishable from SuperCalc, according to SuperCalc's manual. It supports split windows, a 16,000-block spreadsheet, slash commands and all of the other features of SuperCalc. PeachCalc even includes SuperCalc's three tutorial files as part of its package. Wouldn't you think that Sorcim traded Peachtree a spreadsheet for a word processor? Fascinating!

PeachCalc is a good spreadsheet, but it needs more integration with the other programs in PeachText 5000. For instance, if you're working with a proportional print ball in PeachText and you switch to a PeachCalc file, you can't print it directly. Instead, you'll have to save the output to disk, reenter PeachText and print from there (since PeachCalc doesn't support proportional printing). It's a small hassle, perhaps, but a hassle nonetheless.

Also, PeachCalc (and PeachText 5000) makes no provision whatsoever for screen graphics—either analysis or presentation—beyond the simple bar chart abilities of SuperCalc. That's a major shortcoming in an integrated software package.

List Manager is PeachText 5000's database filer. It's marvelously simple in most ways, menu-driven like the rest of

Address correspondence to Thomas V. Bonoma, 45 Drum Hill Road, Concord, MA 01742.

the program and well-conceived. You can select, update, report, define or combine files from the menu, or get help (on-line help is present and adequate for all PeachText 5000 programs), or define mailing labels and other forms. You may have three multiple indexes for your files (predeclared at time of creation only); you may enter duplicate key fields (indexed items) and you can print records in standard or special formats. You can even ask List Manager to reverse last-name, first-name entries on printing.

Of course, you can also create disk output files of your reports and then merge them with PeachText for form letters. The report select functions are adequate—you can change your data file structure without undue hassle or inconvenience by combining files.

What are the restrictions? Well, wrongly, List Manager limits records to 14 items, although it will accept multiple-line items. You have to tell it at the time you create a file how much space to reserve on the disk for records—a foolish requirement since few can know in advance.

List Manager treats all entries as alphanumeric ones; that is, there is no number manipulation allowed in the program (although PeachText in some ways makes up for this through its variable specifications). If you want records sorted by ZIP, for instance, this isn't the program for you.

Well, Well, Well...

Now...how does all this material work together? Pretty well, all things considered.

PeachText is the heart of the system; that suits my biases exactly, since most of what I do is word processing, with occasional need for list management and spreadsheet abilities. PeachTree itself works well, but it doesn't give the cursor control or the integration we've come to expect from several lesser word processors. The spell-checker is marginal, but the thesaurus is a real find.

PeachCalc is no 1-2-3, but it gets the job done. List Manager may be all you need for routine name/address kinds of filing, or even for contribution lists for a charity. I should mention that there are "hooks" left in the program to allow you to buy Peachtree's telecommunications package and hook it into the main menu as well.

T/Maker's Alternative Integration

Another granddaddy for the PC? You bet, and it's better shape than ever!

T/Maker III is a CP/M "translate-over" that became famous in revision II as the free-form spreadsheet. And so it is... Fig. 1 shows the program's spreadsheet, list management and other capabilities.

In revision III, T/Maker has been enhanced with two new features. Most significant is a full-blown word processor, which, like PeachText, is a text post-processor that is quite adequate for

many jobs. Unlike PeachText, your tables, list or even graphics can be just part of the document—it is truly integrated.

The same electronic scroll you write the report on, for example, can have a table of any length stuck right in the middle of it; the program will perform the relevant calculations, "clean" the symbols used for calculating and give you presentation-quality output of text and tables or lists.

T/Maker III also has a bar graph command that will depict your data graphically (bars only—no pie, line or other charts), insert the graph in the text and print it out just like any other set of text. This is because T/Maker III doesn't use special graphics characters; it instead uses line printer graphics made up of slashes and the like. It's not very pretty, perhaps, but it's serviceable.

T/Maker Treats

T/Maker's spreadsheet has 19 different statistical functions; the ability to combine different tables residing on disk and in memory (by adding, for example, the entries over months for a yearly summary) and many other features. The list management functions in the program will sort and tally your lists at your command.

The word processor has somewhat minimal capabilities, but nonetheless will give you aligned and justified text with the capabilities to bold, underscore and super/subscript. It is modifiable for specialty printers, and can handle most work-a-day chores.

How comfortable you become with T/Maker's unique spreadsheet abilities, its list management facility and its spreadsheet/graphics options depends mightily on how much effort you're willing to expend. There's an on-disk demo given with the package, but it isn't a tutorial. The tutorial in the manual is a good one, and the stand-up set of spiral-bound reference cards is a life-saver (but incomplete in several important regards).

You can't sit down with this program for an evening and be doing complicated spreadsheets the next morning unless you forgo sleep altogether. But if you'll put in the time, T/Maker will deliver.

Especially nice is a configuration utility that allows you to redefine all of the maker's choices for editing and other keys into a pattern that more suits your tastes (but don't try to use the Alt+ or Shift+ Function keys... there's a shortcoming in the T/Maker configuration utility that won't allow that).

Also nice is the ability to define a "high bit" character that can be used as a prefix to other characters, so that you can translate a 255+213 code combination into a "bullet" graphics character on the Epson. T/Maker supports PC graphics characters as well.

More Word Processing: ReadiWriter, PIE Writer and PFS:Write

Version 1.10 of ReadiWriter is available. ReadiWriter is a text post-processor similar to The Final Word, but at something less than one-third of its price. Like The Final Word, ReadiWriter will enumerate lists and make indexes, tables of contents and just about any other writing task you might find irksome but necessary. But its editor isn't as good, the editor and post-processor aren't as well-integrated and you might even want to think about using IBM's Personal Editor for the writing and ReadiWriter for the output.

The program supports a mind-boggling array of "tags," or commands, to format text into quotations, lists and the like. It has a full macro capability, permitting substitution of one phrase for another, can be used for mail-merging variable files and supports a wide array of printers.

Take a look at it, especially if you grew up with IBM's Script (ReadiWriter has the ability to support the syntax of this mainframe formatting system). It has some rough edges in the documentation, but the people at ReadWare Systems will make up for all of them with their support policies. They ginned up a device driver for a printer but they didn't support, for instance, in three days. That's hard to beat!

Apple PIE for IBM

Perhaps you had, or have, an Apple in addition to your IBM PC. Then you'll probably be familiar with PIE Writer for the Apple II, and you'll be pleased to know that this superb word processing package has been rereleased for the IBM. One of the characteristics of granddaddies like PeachText, T/Maker and PIE Writer that have evolved on other machines is that they come to the PC in second- and third-generation form. It's a pleasure to use them, and a pleasure to review them.

PIE Writer is a superb word processor in which all of the glitches have been worked through, significant user "comfort touches" added, and value-added revisions made.

PIE Writer is made up of two programs: a good editor with full function-key control and a "dot command" formatter that allows the usual bold-facing, underlining and general text-formatting. The system disk configures itself (after back-up, please) for either 64K or greater-than-128K systems, monochrome or color adapter card displays (color buys you no color, however), and with the standard variety of printers. Menu choices in almost all instances do not require the return key, a major advantage, and the system is quick and good.

Since it's hard to talk about the standard features of any package like word

processing, except to say that the package does them competently, let's look at some bells and whistles. Among other things, PIE Writer allows you to get a disk directory at any time, to insert or retrieve the file name you are editing into the file, to get the date from the operating system, to do split-screen, two-file editing and to do easy extractions of text to "slide" files for later boilerplating. The hooks into the operating system are nicely done and appreciated when you're doing a letter and wondering why you have to type the date yet another time.

But there's more. A good mail-merge facility allows for form letters and the like, while an especially clever set of escape commands lets you direct program input/output to and from peripherals (e.g., to achieve a telecom-

munications function). If you had PIE Writer on the Apple and on the PC, the manual points out, you'd need no other software to accomplish machine-to-machine transfers of files.

Generally, the system operates as well as its design would indicate, although there is no on-line help (but there is an on-disk tutorial). Thoughtful provisions have been made for the way writers write, rather than using the easiest programming method. For example, you can set up headers and footers, but keep them from appearing until p. 2 and beyond.

The split-screen editing, duplicated only by Edix and The Final Word, is a major benefit for keeping an outline on one screen and the manuscript on the other.

Find/replace commands are also quick

and well-done. About the only things I've found that PIE doesn't do are super/subscripting and footnoting, full configuration of printers (you can embed codes in the print file, but the coders could have, for example, given us full color control on the IDS or implemented the Epson's pitch controls automatically), and proportional print-font translation tables (to be found currently only on Peach-Text, The Final Word, SuperWriter, and ReadiWriter).

Omission Control

Whether these omissions will make this package less than useful to you is a matter of personal judgment. I find that the simpler word processors, like Volkswriter or PFS:Write, can handle 70-75

Here is a list of clients. Note the right-justified output from the word processor. The table will be centered automatically.

CONSULTING

EGK

7/5 Phone with S. .5

MAC/OUTFOX

7/6 Meet with M on presentation 2
7/7 Prepare for presentation 1
7/8 Give presentation 5
7/21 Prepare final presentation 2.5
7/22 Give final pres. 7

Snack

7/15 Phone with LV .5
7/28 Phone with LV .5

Tawny

7/26 Board meeting 5

■■■ Here is the table of figures from the above: ■■■

Consulting Summary

Client	Rate	Days	Total
Tawny	1,000	1.00	1,000
Snack	2,000	0.13	260
Outfox	2,500	2.19	5,475
EGK	2,000	0.06	120

TOTAL 6,855

✓ ✓ Here is a bar graph generated by T/Maker for client totals:

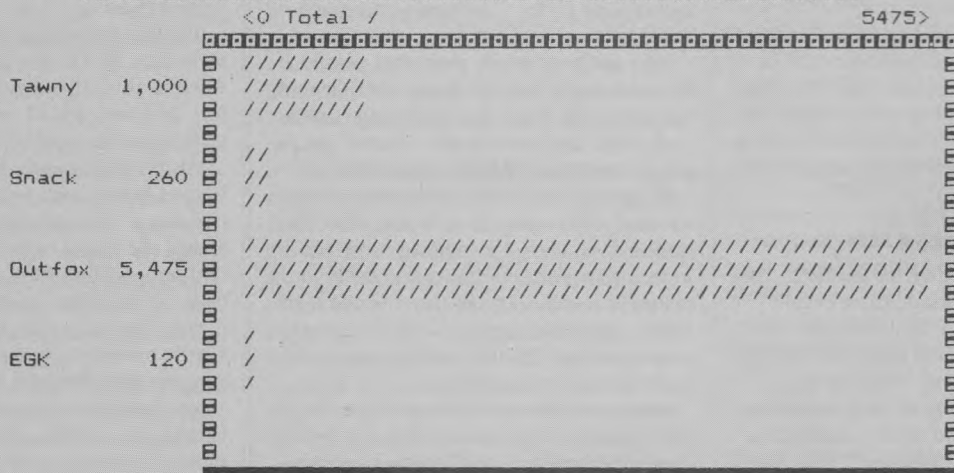


Fig. 1. T/Maker output. Note the special characters made possible with configuration.



GIVE YOUR CHILD THE PLATO EDGE IN ALGEBRA.

For use with the Apple II Plus and Apple IIe:

New PLATO® lessons in Elementary Algebra*

Help your child feel confident about learning algebra skills. This new PLATO series helps simplify Exponents, Polynomials, Roots and Radicals, Factoring and other Algebra components. Practice problems change at random and examples of solutions help keep kids motivated.

New PLATO lessons in Computer Concepts†

This series helps kids understand the computer and lets them practice what they learn.

Lessons include: The Computer Keyboard, Storage and Memory, Files and Editing and Databases.

Widen your child's world

Other PLATO lessons include Elementary Math, Foreign Languages, Physics-Elementary

Mechanics, Computer Literacy and #Keyboarding.

All PLATO micro courseware is available for the Apple II Plus and Apple IIe. Selected lessons are available for the TI99/4A and Atari 800.

For a free catalog

See the growing line of PLATO micro courseware at selected retail outlets. For a free catalog, call toll-free: 800-233-3784. (In Calif., call 800-233-3785.)

Or write: Control Data Publishing Co., P.O. Box 261127, San Diego, CA 92126.

*Developed with Courses by Computers, Inc.

†Developed with Continuous Learning Corporation.

#Developed with Gregg/McGraw-Hill.

Warranty available free from Control Data Publishing Co., 4455 Eastgate Mall, San Diego, CA 92121



Circle 47 on Reader Service card.

PLATO
COMPUTER-BASED EDUCATION

GD
CONTROL DATA
PUBLISHING

percent of most users' needs without fuss, bother or complexity.

A small fraction of us (like me) need the full-blown power of a PeachText, The Final Word, PowerText or ReadWriter, mostly because of the proportional printer support, footnoting and reference needs. For the rest, PIE Writer and a good spelling checker would probably be a better choice than WordStar, with its over-blown complexity and lack of customer service policies.

Write On, PFS!

PFS:Write is one of the *de minima* word processors; it substitutes great simplicity for function, and, if used with PFS' other programs (File, Report or Graph), comes pretty close to doing most of what the average user might need.

PFS:Write is marvelously easy to use; it's partially integrated with Software Publishing Corp.'s other PFS programs, Graph and File/Report.

Compatible with either color or monochrome monitors and with a variety of printers, it's a useful system that should be given serious consideration by any user (1) not already beyond its capabilities, (2) needing graphics and text integration, (3) currently employing PFS: File and (4) who is sick of the incredibly long and poorly-written documentation of other word processors.

Text Editing

Text editing with PFS:Write is a joy. The cursor movement, scrolling and other operations-level details have been dealt with well, providing the kind of transparency between you and your ideas that you want. The program isn't always getting in your way with some stupid two- or three-key code; rather, it just lays back like a California manager and lets you go at it. Integration with the

PC's function keys and cursor keys is total.

It does have some disappointments. The major one is that the "hot zone," where PFS:Write breaks lines, is not adjustable by the user and not adjusted very well. This gives a kind of semi-ragged right margin.

Another less-than-adequate feature is the way in which you must do character-by-character underlining and bolding after you've typed a word. So, to under-

MONTHLY SALES (IN THOUSANDS)

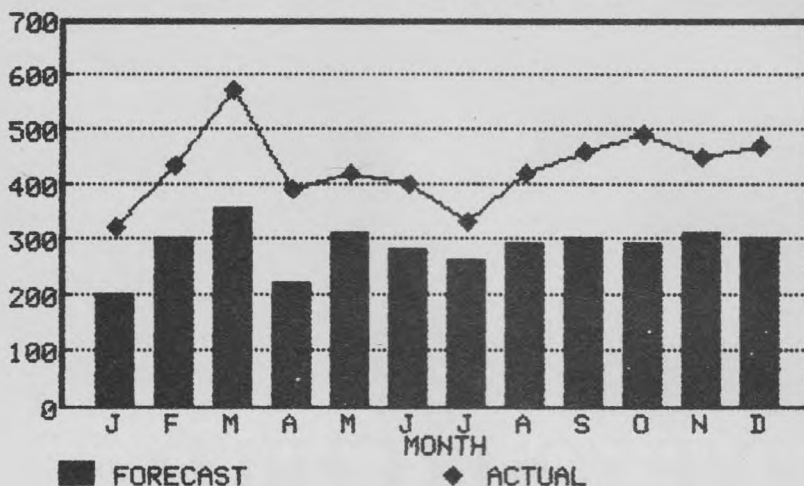


Fig. 2. Eighteen-line graph generated by PFS:Write.



stuff their stocking

Give them what they need.

Microcomputing is a guaranteed hit with computerists. It's stuffed with information on:

- *new programs
- *hardware and software reviews
- *new product reviews
- *buyer's guides
- *innovative computer applications

And each month *Microcomputing* extends the capability of their machines to help them grow with the ever-changing world of computing.

For just \$24.97, give a gift they'll use and appreciate every month.

Give *Microcomputing*.

YES, I'd like to give a year of MICROCOMPUTING for Christmas (12 issues/\$24.97).

☐ Check Enclosed ☐ MC ☐ VISA ☐ AMEX ☐ Bill me

Card # _____ Exp. date _____

Signature _____

My Name _____

Address _____

City _____ State _____ Zip _____

Please enter a one year gift subscription to:

Name _____

Address _____

City _____ State _____ Zip _____

MICROCOMPUTING®

PO Box 997 • Farmingdale, NY 11737

Canada & Mexico \$27.97, 1 year only, U.S. funds drawn on US bank. Foreign Surface \$44.97, 1 year only, U.S. funds drawn on U.S. bank.
Foreign Airmail please inquire.

63NB7

All Christmas gift subscriptions will begin with the Jan. 1984 issue.

line "underline," you'd type it, backspace to its beginning and then hit shift plus F7 for each character in the word.

Back on the good side for one more moment—PFS:Write does yeoman service in reading others' text files, as long as they are in ASCII. So while it may take a while to do a disk read, there is nothing preventing you from reading and writing WordStar files if you'd like.

Printing

PFS:Write does its job without complaining, and does it to any of the regular DOS ports. Before you first run PFS:Write, you can run a print utility (sent on the samples disk, a bad idea) that will configure the serial port.

The program allows the output of special hex codes to enable and disable special functions (e.g., wide printing) on your machine. But that's not nearly as good as writing configuration files for different printers, because the user has to know which code does what for the printer, and he has to learn how to output it.

Also, the print routine (actually, the set-up-page routine) supports up to two lines of headers and footers, including automatic pagination. However, headers appear on every page, so you can't use them in a letter, for example. Special character manipulations are not allowed in headers and footers. No footnotes are

supported either, and proportional printing is not supported unless your machine allows the program to send out codes that enable it.

Advanced Features

What we've got so far is a competent text editor, maybe even a word processor, that does almost everything the casual writer might need but very little required by the professional. PFS:Write has a number of advanced features, however, that rescue it from obscurity:

- Include files: With PFS:Write, you're allowed and encouraged to include a copy of other files in your word processing document. This allows easy boilerplate creation, of course, but more importantly, expands what is a pretty small text buffer (this much text gets the buffer 14 percent full on my system) to let you do documents of "real" lengths (15–40 pages).

- Graphs: If you have the PFS:Graph software package (sold separately and reviewed in this column last month), you can include a graph picture anywhere in your text just by naming it. Then, when you print (and knowing you'll need an IBM or Epson graphics printer, Okidata, IDS, NEC or C. Itoh machine to do it), the program automatically gives you an 18-line graph. (See Fig. 2).

- Form Letters: If you have PFS:File, you'll have a mail-merge ability with PFS:Write that will allow you to create form letters or merge data with a text template you'd like.

- Envelopes: PFS:Write has a neat little feature that "assumes" the first block of left-justified text in a document must be an address, and will semi-automatically print your envelopes for you without any retyping.

The program gives great color display on systems so equipped, and the documentation is up to PFS standards, which are the best in the business.

Signs and Graphics

Having just finished a review of seven PC graphics packages for a competitive magazine, I'm in no mood to look at more. However, two packages deserve mention.

Pyxel Visuals is a clever little package that outputs four character sizes of text, horizontally or vertically oriented, with line drawing capabilities on the Epson (Grafrax) printer. The program requires 128K, is surprisingly cheap and even more surprisingly functional. The program makes nice tables with only a little work, draws pretty pictures and does a nice job with text as well.

I especially like the function-key-

YOU MISSED IT!



But you still need that issue of *Microcomputing*. Well, it's not too late to get it. Send for your free Back Issue Catalog. A complete listing, including editorial highlights.

You still need it.
And we've still got it.

YES, I want my free Back Issue Catalog for *Microcomputing*.

Name

Address

City State Zip

Microcomputing, Mail Order, 80 Pine St., Peterborough, NH 03458

Circle 73 on Reader Service card.

NOW YOU CAN PROTECT ALL YOUR SENSITIVE ELECTRONIC EQUIPMENT FROM POWER SURGES CAUSED BY NEARBY LIGHTNING STRIKES.

BY INSTALLING JIBE ELECTRONICS SURGE ARRESTERS IN YOUR SERVICE ENTRANCE CIRCUIT BREAKER PANEL, YOU CAN PROTECT YOUR ENTIRE ELECTRICAL WIRING SYSTEM FROM POWER SURGES DUE TO NEARBY LIGHTNING STRIKES.

NO HOT WIRES TO CONTACT! JUST FOLLOW EASY TO INSTALL INSTRUCTIONS.

RATINGS

Peak Current	15,000 Amps (8x20 μ s)
Transient Energy	200 Joules (10x1000 μ s)
Clamping Voltage	365 Volts max.
at 300 Amps (8x20 μ s)	
Cont. Line Voltage	130 Volts max.
Trans. Response Time	< 3 nanoseconds max.

Model V130-JHE-G* \$350⁰⁰ ea.

(2 Req'd per 120/240 Volt System)



***Fits all circuit breaker panels except Square D and Cutler Hammer or your money back.**

Send check or Money Order for \$70.00 (2 arresters) to:



Jibe Electronics

Phone: 802-328-4076

RD #2, 128 Fellows Rd.,
Guildhall, Vt. 05905

ANALYTICAL
PROCESSES



CORPORATION

BUSINESS SOFTWARE

for

IBM-PC, OSBORNE, XEROX
NORTHSTAR, RADIO SHACK
EPSON QX-10, CPM & MS-DOS

*All Prices Include Full Support
and Source Code*

\$ TAX/PACK \$

TAX/PACK for practitioners is complete, coordinated, and includes most-used forms and schedules. Prints all schedules, no masks, no data field entered more than once. All data passed automatically between schedules and 1040. Fully supported all year. Partial or full system. Can be used for single or multiple returns. Extremely flexible. Computing taxes for over five years.

\$995.00

MORE ! TRIED & TRUE APPLICATIONS

- MAIL LIST MANAGER
- MEMBERSHIP LIST MANAGER
- UTILITY BILLING
- REAL ESTATE APPRAISAL
- PETROLEUM DISTRIBUTORS
- RETAIL INVENTORY & BILLING

Send Check, M.O., or VISA/MC Number
and Expiration Date TODAY to:

ANALYTICAL PROCESSES CORP.
635 Main Street - P.O. Box 1313
Montrose, Colorado 81402



For More
Information
Call:
(303) 249-1400

We Are Unique... Try Us... Find Out

driven design, which also allows you to move text all around the screen, aligns it and prints in either a "slide show" format or on the Epson. There is no plotter support in Pyxel Visuals; when I talked to their design people, they said it was because they didn't think current plotters did a very good job. Well, to each his own. If you don't mind "burning" transparencies from printed output, this program is a great slide designer at a low cost.

The Decision Resources people have split off their sign generation utility from their business graphics program, enhanced it and will be selling it under the name SignMaster by the time you read this. I tested a prepublication version that may be enhanced a good deal by the time you can buy it; right now, it does all the standard stuff you'd want from a sign generation program (but only to a plotter) quite well.

I often find that many of my slides are text-driven rather than table- or graph-driven, and this program does a good job at the former task with full menu control, adjustable fonts and letter sizes, and automatic underlining as well as bolding. It's kind of a little word processor for your plotter.

Databases, Almost Databases, Specialized Databases

Undoubtedly, you know dBase II has been revised a notch by now, and I should have a review of it for you next month. This month, I want to concentrate on two full DBMS systems and three partial ones.

DataKeep (version 1.1), from Mathematica, Inc., is a solid all-around DBMS program that is menu driven, has a good report generator and allows many of the more sophisticated functions (data validation from a file or list, minima and maxima of entries, default entries, transaction fields and automatic field filling).

That's not the half of it. In addition to a standard report generator, DataKeep generates "tabulation reports"—essentially, one-way and two-way contingency tables—on your file.

For instance, if you have three product codes in stock and three colors for each, DataKeep will give you either counts or percents in a 3x3 table of codes by colors. This is a super option for the quantitatively oriented out there, and a good one for the rest of us. Another option in the report generator handles mailing labels and lists.

Well, that's not so much, either, but the interface ability of DataKeep is. The authors have gone to the trouble of writing code to allow DataKeep to generate .DIF files pre-prepared for your graphics program to make bar or pie charts out of your data file.

The interface program handles the graph labels and extractions from the data file, and generally sets up a file so

that all you have to do is boot 1-2-3, VisiPlot or whatever, and go. A similar facility will transfer data files in a format so that spreadsheets like Multiplan, SuperCalc or VisiCalc can use them.

Another interfacing facility sets up selected fields from your file in WordStar, Wordplus, WordPerfect, Wordix, Peach-Text, EasyWriter, Spellbinder or Multi-Mate word processors, either for mailing list usage or as a forms interface.

Finally, DK has an interface device to Ecosoft's Microstat program for doing more extensive statistical analysis on your data file.

DataKeep: One-Way Street

Now, how does it work? The interfaces I tested worked well, though some experimentation was needed to make DataKeep's meaning clear when it prompted for parameters and values, especially in the graphics interfaces.

There is no doubt that Mathematica has given much attention to integrating its output with other programs you might own—a major benefit to most users. However, the program authors might have given more attention to file import than to the three pages assigned in the manual to variable vs fixed-length records. Examples of how to get your data over from 1-2-3, or even dBase, might have been given as well.

As it is, DataKeep is a sort of one-way street, intended to be the heart and soul of a quasi-integrated processing system, but with imperialistic tendencies toward "talking" to other programs but not "listening" to them.

Additionally, a new revision of DataKeep is in the works; it's more expensive (of course), but more fully relational (append, join commands added) and has more two-way interfacing abilities with Multiplan and 1-2-3, for instance. Written in compiled Basic, DataKeep is no speed demon, and a lot of chaining and disk-swapping goes on.

Couple this swapping with the additional swapping for your spreadsheet, graphics package and word processor, and you'll have to be a veritable whirling dervish or have unlimited floppy drives to get the full advantages of DataKeep.

This program has promise, but delivers right now on only 70 percent or so of that promise. I'd counsel waiting on it a bit until you see what revision 2—and perhaps even revision 3—looks like.

Superfile Simplicity

Superfile is at the other end of the continuum from DataKeep. It features one disk, adequate but not awesome documentation, a history on CP/M machines and simple functionality.

The nicest thing about Superfile is that it is a DBMS without the "D." That is, the data files are regular old files (like this one) to which you make a couple of modifications with your word processor and

then grind them through SuperFile. What modifications? Well, take this paragraph, which we could go to the front of the type *C to indicate it is the start of a data "entry." We could then jump to the end of it and type

*K
DBMS/SuperFile/Microcomputing/
Column/November, 1983/*E

The *K signals to SuperFile that a key word list is coming—the way the program indexes entries for retrieval. The list itself can be made of any old things you like. The *E signals the end of a record. That's all there is to it!

Key words will be put in a dictionary, which you can view and use for retrieval. Data disks themselves are "marked" by SuperFile (it only makes sense), so the program can tell you to put in the disk of "Microcomputing Columns" when you ask it to retrieve the SuperFile entry. If you're indexing articles, SuperFile allows you to put another asterisk after the beginning indicator but before the keyword, which acts as a "short form" display.

The program will give you only this "top" of the record, unless you opt to see the remainder. SuperFile accommodates 16 disk drives or hard disk sections; it also accommodates ambiguous file names.

Search and retrieve capabilities of the program are very fast. You can search the keyword dictionary in three different ways and the database with a powerful Boolean combination or AND, OR and NOT. If it can't find your keywords, SuperFile will give you some others that are "close" to what you asked for, and tell you to try again. Output can be made to the printer, screen or a disk file at your choice.

Program utilities include a sort and merge utility, a file split utility, a rename utility and a character changer routine.

With the sort and merge utility, you can combine many files into one big one, sort it alphabetically or by number or word, and output it. File split is used to break down large files into smaller ones, and to append information to existing files. The rename utility is obvious. The character change utility can be used to "clean" a file.

There is also a customization utility that lets you change display (white/black versus black/white) and print parameters and legal drives.

Superfile has a "Practical Uses" section in the manual (written for CP/M users, but with an IBM PC addendum), which is most useful. The system is so powerfully simple that the first-time user is tempted to throw up his hands in despair at the sheer possibilities.

If you're dissatisfied with forms-oriented DBMS programs and you need to work under DOS (if you work with the p-system, Datafax is a program similar in

concept to Superfile), I'd urge you to look at this program. At \$195, it isn't cheap, I grant, but it works and that's the key.

For another \$95, the SuperFile people will sell you a mail list program that works with SuperFile and with Word-Star's Mailmerge data files. I don't give out "excellent" ratings often, but this program gets one with no reservations. It will run on any 64K or better PC.

Citation Citings

Citation (version 3.1) received one of *Infoworld's* rare "4 excellents" reviews. It doesn't do that well by me, although it is a sound package. Citation is a menu-driven, dedicated filing/retrieval program that stores citations in one of three preconfigured formats: a periodical citation form, a "publication" form or a name/address form.

Each form has been precustomized to the task at hand, and is unchangeable. For instance, the publication form has title, authors, chapter, page, publisher and date areas, as well as a free-form text area and space for the multiple keywords. Citation uses to keep track of the records.

The program allows you to enter data, browse through records and report printing. It also allows certain utility choices, including the recreating of damaged data files and the merging of smaller files into one larger file. Program operation is smooth, clean, clear and a marvel of good coding. The no-nonsense manual is equally clear. Perhaps the best feature of the program is its ease of use.

So why aren't I raving? I generally have trouble recommending preconfigured applications, since user needs change rapidly over time but such applications can't. There is nothing in Citation that you couldn't configure with Cardbox (see last month's column). The latter program, though, could be used for a custom-designed student grading list or file cabinet contents tracker.

This isn't to say that Citation can't be made to do those things, because its large free-form text area (ten 80-column lines) and generous keyword formats (six lines by 20 columns) give you a great deal of flexibility. It's only to say that the ability to customize often is worth having, and I think it is here as well.

The second reason I'm not sold on Citation is that I don't like living with other's choices about how I should keep records. In any discipline I know, it is customary to cite the beginning and ending pages of documents, periodicals or whatever (e.g., 110-125).

You can't do that with Citation, because you may input a single four-character page for either "periodicals" or "publications." That makes these forms useless to me; of course, I could put the page numbers in the comment area, but that seems to defeat the purpose of entering them in the first place, since, when Citation reports out, the page number

Circle 348 on Reader Service card.

ACTIVE TRACE the UNutility

Why? Because when BASIC users have ACTIVE TRACE, they don't need caffeine to stay up nights doing the tedious work that a computer should do.

Do these real reactions to ACTIVE TRACE sound like they are describing an unglaorious, unsexy, stay-in-the-drawer utility?

Beginner

"It's really neat," said a beginning programmer who'd copied a program, which wouldn't run, out of an instructional book. "Active Trace worked right away, and I didn't even read the documentation. It showed me the problem, and then I figured out how to fix it."

Professional

"Active Trace saved my a**!" said a man whose business is programming and customizing. "I don't work without it."

Critic

"Extremely useful program," said a professional reviewer. "If you do much programming in Microsoft Basic, you'll appreciate Active Trace a lot."

WE DO WINDOWS

ACTIVE TRACE pops a window into Basic that lets you see inside your program as you run it, letting you know variable values as they change. You can analyse all variables and functions throughout your program, or just those you specify in a section of your program. There is no need to "single step." In a form a novice can understand, a program's activity is presented on your screen, or printer, or for the more advanced programmer, as a disk file. The disk file can be used with your word processor to automatically find the source of an error and display the circumstances surrounding its occurrence. Complete, professional cross-reference facilities are included.

*Jerry Pournelle, *BYTE Magazine*, April '83, p 234.

To order or request information
contact your dealer or
CALL TOLL FREE 800-358-9120 (US)
In California call 800-862-4948

Active Trace

Complete package includes Scope.
XREF mapping and documentation

\$79.95
was
\$125.00

Scope Separately

Only recommended for those who already
own professional mapping (MREF) programs

\$49.95

Documentation

Applicable to purchase

\$12.50

Active Trace is available for most MS-DOS and CPM 2.2
systems and supports the special features of Brand specific
versions of Microsoft Basic such as BASICA on the IBM-PC.

AWARECO
Active Software

P.O. Box 695 Gualala, CA 95445
(707) 884-4019

Active Trace, Active Software, AWARECO and Scope are
trademarks of A Ware Company—CPM is a trademark of
Digital Research—MS-DOS and Microsoft are trademarks of
Microsoft Corporation—IBM-PC is a trademark of IBM Corp.

won't be where I want it on the printout.

When I talked to the Citation people about this, they said, "Nobody ever suggested that to us before." Either the program is being used totally by hobbyists that find a single-page reference in *BYTE* sufficient to their needs, or there's something Eagle Enterprises' best friends aren't telling them.

Similar problems occur in the name/address file. Ever try putting an international phone number, complete with dashes, in a 12-space field? I have; they won't go. Again, the phone can be input elsewhere, but what is the field for if it can't handle all the action? I think Citation is a good program, but certainly not a great one. If you're willing to bend your needs to the requirements of the software, well and good. I think I'll not do that for now.

Know Your Client

Know Your Client is another preconfigured filing system I've had problems with. It's intended to help managers, professionals and salespeople keep track of their clients and associates—an invaluable need currently filled by Rolodexes and scraps of paper. Unfortunately, this program's implementation doesn't do that well.

The fixed data format includes spaces for the contact's name, position, com-

pany, business and home addresses, two phones, secretary (indispensable!), family; last contact date, notes and follow-up date. There is also room for four to 12 "common factors" this individual might share in common with others in the database (e.g., Elks). The program will retrieve records by first or last name, position, company, business, city, state or ZIP, one of the two dates explained above or "common factors."

What's wrong with Know Your Client is similar to Citation's weaknesses, although the former's assembly language program is much more polished than Citation's Basic code.

Do you have an Executive Vice-President of Operations to input? Sorry... only 30 characters are allowed for position. Abbreviate? Well, OK, but if you type Sr. Exec. Vice-Pres. and later try to retrieve Sr. Exec. Vice-Pres., you won't find anything (because of the missing period after "Sr"). This is so troublesome that Know Your Client gives you a page in the appendix with which to keep track of abbreviations.

Do you have anybody who works for Alcan Aluminum Corp.—Building Products Division? Too bad... only 30 characters are allowed for Company, and there's no place for the division (except for the notes section).

The common factors idea is good in

principle as a kind of cross-index, but it's defeated (1) by the fact that you have to tell the program how many of these will be in your database *when initializing a data disk* and before entering any data, and (2) because the length and number of common factors is related.

If you predeclare 24 characters for each common factor, you'll be able to enter only two of these per record. Predeclare four characters per common factor, and you'll be allowed to enter 12 of them per record. Just how is it you're supposed to know beforehand that you won't think of a new common factor for a subset of records in the middle of data entry?

What's worse is that partial searches (e.g., finding all companies with "Man" in the name) are not allowed and dates must always be entered with leading zeroes.

On the plus side, the program makes good use of the function keys; it's simple in operation and it has a clearly written manual and command flowchart. There is a toll-free product support line, a free back-up disk provided when a card is sent in and a free newsletter when the product registration is returned. I find it hard to envision the sales manager or executive being satisfied with this effort.

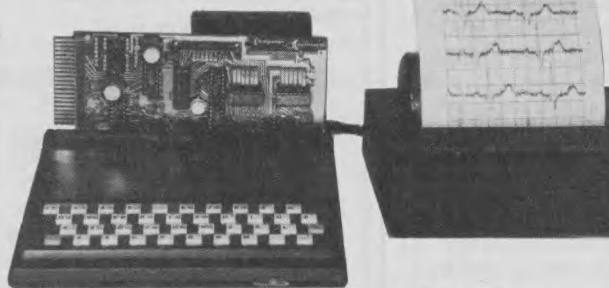
Happy Trails

To end on a positive note, the Personal

FFT* - SCOPE on TIMEX

• Dual channel • Cursor • Trigger • Averaging • High res printout.
Resolves up to 75Khz. High speed program on EPROM.
*Fast Fourier Transform for spectrum analysis w/ magnitude & phase data.
Uses TS1000, 16K RAM, TS2040 printer, and our A/D + D/A board.
EPROM card with A/D + D/A Board and complete documentation. \$275.

FFT EPROM alone, 256 points, in Z80. Two 2716's or one 2764 & docs ... \$75.



Not Just For Timex: 8+8 channel A/D + D/A Board.

Connects to CBM64, APPLE, TRS-80, Jupiter Ace, others. Connects to micro-processor buss to give you higher speeds and ease of programming.

Fast: 200K samples/sec with Z80A. A/D convert time 1.6µs.

Easy to program: One PEEK chooses the channel, starts the conversion and gets the data. Routines provided. Many on board options such as the ability to switch select the decoding address anywhere on the memory map. 8 bit resolution converters; routines for higher resolution. Manual w/software.

Low cost: Assembled and tested \$195. Cable \$15. Box \$15.

Other peripherals for Timex: Buffered Buss/Development Board kit \$65; Connectors; software.

Please call or write for **FREE CATALOG**.

Computer Continuum

301 Sixteenth Avenue
San Francisco, CA 94118

(415) 752-6294

Circle 392 on Reader Service card.

WANTED

"Buyers," & We'll pay the shippin'

• CALL FREE (800) 654.4058 •

"Call For Reduced Prices At Various Quantities"

Verbatim.	Dysan CORPORATION	3M Scotch
5 1/4" sin-side dbl-den. 2 45	5 1/4" sin-side dbl-den. 3 95	5 1/4" sin-side dbl-den. 2 35
5 1/4" dbl-side dbl-den. 3 50	5 1/4" dbl-side dbl-den. 4 45	5 1/4" dbl-side dbl-den. 3 25
5 1/4" sin-side quad 3 45	5 1/4" sin-side quad 4 45	8" sin-side sin-den. 2 45
5 1/4" dbl-side quad 4 45	5 1/4" dbl-side quad 4 95	8" sin-side dbl-den. 3 00
8" sin-side sin-den. 2 95	8" sin-side sin-den. 3 45	8" dbl-side dbl-den. 3 95
8" sin-side dbl-den. 3 40	8" sin-side dbl-den. 4 45	
8" dbl-side dbl-den. 3 95	8" dbl-side dbl-den. 4 95	

Head Cleaning
Kits.... **9 40**
Refills. **14 50**

**We Stock
"Bulk-Packed"
Diskettes**

Disk Minder
• Smoked Plastic
• Holds 75 Disks
17 95 ea.

Prices per ea.
10 per box the

PO Box 1674
Bethany, OK
73008

Diskette Connection™

* (Continental U.S. only. Add 3⁹⁹ on orders under 40⁰⁰)

Bibliographic System does for the professional what Citation *almost* does for the amateur; it compiles, formats and arranges bibliographies. But this program *does* it and does it well, according to the ANSI standard for bibliographic citations.

Using the full power of the Pascal text editor, the program can handle books, articles, maps, letters, manuscripts, reports, newspapers and trade catalogs. Each type of document has its own special form for data entry. For instance, journal articles rightly have a spot for the journal volume and number; books don't have such a space because none is needed.

Citation is smart enough to put entries in parentheses where appropriate, to bracket items in the citation that ought to be bracketed and to format and rearrange citations and the accompanying abstracts automatically.

A follow-up to Citation will be released soon; it will let you take citations from on-line databases and input them directly to PBS for formatting, storing and sorting.

I had a great dBase program for you this month, but I've gone on at such length I'm afraid to try to include it. Remember to stay tuned, though, because next month we'll learn how to program in "dBase II" language, courtesy of John Schnell of the New York Personal Computer Club. □

The "Big Blue" Black Book

DataKeep 1.1 (\$450)
Mathtech, Inc.
PO Box 2392
Princeton, NJ 08540

Know Your Client (\$92.95)
Execuware
7415 Pineville-Matthews Road
Intercontinental Plaza
Suite 300, Box 10
Charlotte, NC 28211

PFS:Write (\$140)
Software Publishing Corp.
1901 Landings Drive
Mountain View, CA 94043

PIE: Writer (\$199.95)
Hayden Software Co.
600 Suffolk St.
Lowell, MA 01853

PeachText 5000 (\$395)
Peachtree Software Corp.
3445 Peachtree Road, N.E.
Atlanta, GA 30326

Personal Bibliographic System (\$295)
Personal Bibliographic Software, Inc.

PO Box 4250
Ann Arbor, MI 48106

Pyxel Visuals (\$65)
Pyxel Applications
2917 Mohawk Drive
Richmond, VA 23235

ReadiWriter 1.10 (\$125)
ReadiWare Systems
PO Box 680
W. Redding, CT 06986

Sign Master (\$245)
Decision Resources, Inc.
PO Box 309
Westport, CT 06881

Superfile and MailList (\$195 and \$95, respectively)
FYI, Inc.
PO Box 10998, #615
Austin, TX 78766

T/Maker III (\$295)
The T/Maker Company
PO Box 6430
Falls Church, VA 22046

Circle 60 on Reader Service card.

NEW VIC RABBIT CARTRIDGE AND CBM 64 RABBIT CARTRIDGE



NEW FEATURE! DATA FILES!

"High Speed
Cassette
Load and Save!"

\$39.95

(includes cartridge
and manual)



for VIC

Don't waste your Life away waiting to LOAD and SAVE programs on Cassette Deck.

Load or Save 8K in approximately 30 seconds! Try it—your Un-Rabbitized VIC or 64 takes almost 3 minutes. It's not only fast but VERY RELIABLE.

Almost as fast as 1541 Disk Drive! Don't be foolish — Why buy the disk when you can get the Rabbit for much, much less!

Allows one to APPEND Basic Programs!

Easy to install — just plugs in.

Expansion Connector on rear of the VIC Rabbit.

Works with or without Expansion Memory.

Works with VIC or 64 Cassette Deck.

12 Commands provide other neat features.

Fast Data Files - two data file modes.

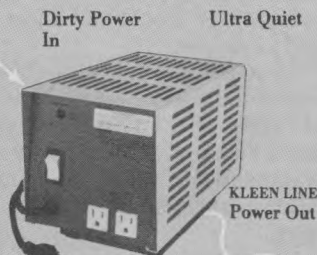
Eastern House

3239 Linda Dr.
Winston-Salem, N.C. 27106
(919) 924-2889 (919) 748-8446

Circle 93 on Reader Service card.

Computer Protection

KLEEN LINE[®] CONDITIONER



Prevents:

- Computer Damage
- Lightning Spike Damage
- Brownout Interruptions
- Disruptive Line Noise
- Program Errors

Regulator • Filter • Suppressor

KLR-250A	250 Watt Load	\$291.95
KLR-250A-150	250 Watt Load; Patented Filter Isolated Sockets	\$346.95
KLR-500A	500 Watt Load	\$390.95
KLR-500A-150	500 Watt Load; Patented Filter Isolated Sockets	\$445.95

Shipping: \$12.75 Land; \$45.50 Air

Ask Your Local Dealer

ESP Electronic Specialists, Inc.
171 South Main Street, Box 389, Natick, Massachusetts 01760

Toll Free Order Desk 1-800-225-4876
MasterCard, VISA, American Express

C-64 Graphics: Spryte On

SpryteByter is Ideal for Both Novice and Pro

SpryteByter

SpryteByter is a Commodore-64 program for anyone interested in doing serious work with sprite graphics. The program is published by Foxsoft, a division of Foxfire Systems. This is probably the most powerful and versatile sprite-development package available. It lets you easily create and edit sprites, both monocolored and multicolored. It makes sprite file handling simple.

The package is ideal for the professional game developer, but the novice programmer should find it just as useful and fun to use.

SpryteByter is full-featured, including almost every practical function that can be applied to sprite development. It saves hours of tedious byte-by-byte programming and allows you to focus your creative abilities on the sprites themselves.

A program called Game Maker, included in the package, provides an easy method of appending sprite and program files for maximum efficiency. There are even separate versions of Game Maker for both tape and disk, along with sample sprite files.

The manual is designed to demonstrate and explain the features of SpryteByter. Programming techniques aren't discussed in detail; users are urged to refer to the C-64 Programmer's Reference Guide for such information. The manual itself is good, providing enough information to successfully use the programs supplied with a little experimentation.

SpryteByter is menu-driven with the bulk of the screen occupied by a 24×21 grid where all sprite development takes place. To the right of the grid is the menu, listing options that apply to the current menu as well as listing the available branches of other menus.

The upper-right-hand corner of the

screen displays all four possible configurations of the sprite—normal, vertically expanded, horizontally expanded and fully expanded. It's a clean display that's easy to work with. The ability to see all four sprite possibilities at one time is a handy feature.

When SpryteByter is run, the first menu to appear is always the draw menu in the monocolored mode. You can use the cursor keys or a joystick to move a cursor and create the sprite. Special commands allow you to draw horizontal, vertical or diagonal lines, or you can reverse the image. This menu also allows you to access other menus to shift or rotate the image, select colors or review the currently saved images.

The shift menu lets you shift the image either up or down, or left or right, up to eight pixels at a time. You can turn the sprite upside down or 180 degrees.

You can also create a mirror image of the sprite. In this, and most other menus, the CLR key clears the sprite while the home key returns the cursor to the top-left corner of the sprite image. The F1 and F2 keys control joystick operation and cursor wrapping. Most of the menus also let you save the current sprite image within SpryteByter's memory; you can save up to 128 different sprites.

Using the rotate menu, you can rotate the sprite around the current cursor position through any integer angle from -999 to 999 degrees.

Positive angles turn the sprite counter-clockwise; negative angles turn the sprite clockwise. If you want a continuous turn for animation, a special turn option will automatically generate a sprite for each multiple of the specified angle. For example, if you select 45 degrees, the turn option will generate a sprite for 45, 90, 135 and 180 degrees.

An Unusual Feature

SpryteByter's rotation routines let you

take into account the fact that the pixels in the sprite aren't square, so turns don't destroy the general shape integrity of your sprite. However, some loss of smoothness always results. The question of what is the most pleasing result is one of aesthetics. It can't be resolved by programming. Therefore, turned sprites usually need some manual touch-up.

Sometimes the results of a rotation can be improved considerably by changing the center of rotation or by shifting the sprite up or down a row.

Besides the rotating functions, the rotate menu lets you make sprites symmetric with respect to both the cursor and a horizontal and/or vertical line that is drawn through the cursor. For this menu, the CLR key has a special function: it restores the sprite present when the rotate menu was entered and moves the cursor to the center of the grid.

The data menu lets you save a file containing all sprite data in SpryteByter's memory on tape or disk. If there are no sprites in memory, you can load a sprite file into memory from tape or disk. The disk functions also allow for displaying the disk directory or for checking the disk status without destroying the program or any data in memory.

One of the handiest features of the entire program is the movie review function in the data menu. With this function, you can review the saved sprites as a "movie." The sprites are displayed one after another with a short delay in between. You can even select the display speed to control the apparent animation as the sprites are displayed.

The data menu also lets you print a representation of the sprite and its data. The printout uses asterisks for the in-

Address correspondence to Robert W. Baker, 15 Windsor Drive, Atco, NJ 08004.

D&N MICRO PRODUCTS, INC.

TERMS \$3.00 shipping. Foreign orders add 15%, Indiana residents add 5% sales tax.

3702 N. Wells St.
Fort Wayne, Ind. 46808
(219) 484-6414

COMPUTER

MICRO-80 COMPUTER

Z-80A CPU with 4Mhz clock and CP/M 2.2 operating system. 64K low power static memory. Centronics parallel printer port. 3 serial ports. 4" cooling fan. Two 8" single or double sided floppy disk drives. IBM single density 3740 format for 243K or storage, double density format for 604K of storage. Double sided drives allow 1.2 meg on each drive. Satin finish extruded aluminum with vinyl woodgrain decorative finish. 8 slot backplane, 48 pin buss compatible with OSI boards.

MODEL 80-1200 \$2995

2 8" Single sided drives

MODEL 80-2400 \$3495

2 8" Double sided drives

MICRO-65 COMPUTER

6502 CPU with 2Mhz clock and DOS-65 operating system. 48K of low power static memory. 2 serial ports and 1 Centronics parallel port. 2 8" single or double sided drives. Satin finish extruded aluminum with vinyl woodgrain finish. 8 slot backplane, 48 pin buss compatible with OSI. Will run OSI 65D and 65U software. Includes Basic E/65 a compiled BASIC for 6502 CPU.

MODEL 65-1 \$2995

2 8" Single sided drives

MODEL 65-2 \$3495

2 8" Double sided drives

BP-580 8 Slot Backplane \$ 47

OSI 48 pin Buss compatible

MEM-CM9 MEMORY/ FLOPPY CONTROLLER

24K memory/floppy controller card uses 2114 memory chips, 1 8K and 1 16K partition. Supports OSI type disk interface

24MEM-CM9 \$325

16MEM-CM9 \$260

8MEM-CM9 \$180

BARE MEM-CM9 \$ 50

Controller on assembled unit

add. \$ 90

BIO-1600 Bare IO card \$ 50

Supports 8K of memory, 2 16 bit parallel ports, 5 serial ports, with manual and Molex connectors.

PRINTERS

Okidata

ML82A, 120 cps, 10" . . . \$409

ML83A, 120 cps, 15" . . . \$895

ML84 Parallel, 200 cps, 15" . \$1150

C. Itoh

8510AP Prowriter, parallel . . . \$419

120 cps, correspondence quality

8510APD Prowriter, serial . . . \$585

F10-40PU Starwriter, parallel \$1319

Letter quality daisy wheel

F10-40RU Starwriter, serial . . \$1319

F10-55PU Printmaster \$1610

parallel, Letter quality daisy wheel

F10-55RU Printmaster, serial \$1610

DISK DRIVES AND CABLES

8" Shugart SA801 \$385

single sided

8" Shugart SA851 \$585

double sided

FLC-66 ft cable from D&N . . . \$69

or OSI disk controller to 8" drive

5 1/4" MPI B51 disk drive with . . \$450

cable, power supply and cabinet. Specify computer type.

FLC-5 1/4 cable for connection . \$75

to 5 1/4 drive and D&N or OSI controller, with data separator and disk switch. Specify computer type

HARDWARE

OSI COMPATIBLE

IO-CA10X Serial Printer Port . . \$125

Specify Device #3 or #8

IO-CA9 Parallel Printer Port . . \$150

CMOS-MEM

64K CMOS static memory board, uses 6116 chips, 3 16K, 1 8K and 2 4K blocks, Partitionable for multi-user, OSI type disk controller, 2 IO mapped serial ports for use with D&N-80 CPU. Ideal way to upgrade from cassette to disk.

64K CMOS-MEM \$500

48K CMOS-MEM \$405

24K CMOS-MEM \$260

16K CMOS-MEM \$210

BARE CMOS-MEM \$ 50

Controller add. \$ 90

2 IO mapped serial ports . . . \$125

on assembled memory board

Z80-IO 2 IO mapped serial . . . \$160

ports for use with D&N-80 CPU card

FL470 Disk Controller \$155

Specify 5 1/4 or 8" drive



STANDARD CP/M FOR OSI

D&N-80 CPU CARD

The D&N-80 CPU allows the owner of an OSI static memory computer to convert to Industrial Standard IBM 3740 single density disk format and CP/M operating system. Double density disk operation is also supported for 608K of storage on an 8" diskette. When used with a 5 1/4" disk system 200K of storage is provided. Optional parallel printer and real time clock. Also available for polled keyboard and video systems. Compatible with C2, C3, C4 and 200 series OSI computers.

INCLUDES CP/M 2.2

D&N-80-1 Serial 8" disk . . . \$595

D&N-80-2 Video 5 1/4" disk . . \$595

D&N-80-3 Video 8" disk . . . \$595

Option 001 \$ 60

Parallel printer and real time clock.

HARD DISK DRIVER \$140

Allows D&N-80 CPU board to control OSI 40 or 80 meg hard disk unit. Will not destroy OSI files. Will also allow for a true 56K CP/M system. Specify 40 or 80 meg drive.

BUSSTransfer \$135

Allows for D&N-80 and OSI CPU to be in the computer at the same time. Toggle switch provides for alternate CPU operation.

DISK TRANSFER \$100

Utility program to transfer OSI CP/M format disk to IBM 3740 single density format. Will also transfer IBM to OSI format.

SYSTEM HARDWARE

REQUIREMENTS

D&N-80 CPU, D&N FL470 or OSI 470 controller, 48K memory at 0000-BFFF, 4K memory at D000-DFFF, two disk drive cables.

FORMAT TRANSFER \$15

You supply software on 8" diskette D&N will transfer OSI CP/M format to IBM 3740 CP/M format. Can also transfer IBM 3740 CP/M format to OSI CP/M format. Original diskette returned.

dividual pixels in an exploded view and prints the corresponding Basic Data statements for each line of the sprite. You can also input sprite data and draw a sprite from that data. This lets you easily preview and edit sprites from magazines or other program listings.

The review menu lets you review any specific sprite currently saved in SpryteByter's memory. You can advance forward or backward one sprite at a time. This menu is also used to delete and insert sprites in memory or to logically AND or OR two sprites.

There are three separate color menus that let you select the sprite, background or border colors, or enter multi-color mode. The color submenus let you select between all 16 available colors, no change or the original color.

Since SpryteByter's menus in the monochrome mode are the same color as the sprite, if the sprite color is the same as the background color the sprites and menu will seem to disappear.

When SpryteByter is in the monochrome mode, you can press the shift and return keys together and restore SpryteByter's default colors.

The multicolor mode has slightly different functions, but it allows you to develop multicolor sprites. The line draw options are not available; there is only one joystick-draw method and the turn options always rotate around the center of the sprite. Most other functions are the same for both multicolor and monochrome modes.

SpryteByter reserves 8K of memory for storage of sprites as you design them. In every SpryteByter menu there is an option to store the current sprite. They are stored in numerical order from 0 to 127. At any time, the sprite file can be reviewed through the review submenus of the data menu.

If you wish to change a sprite already in memory, it can be recalled through the edit option in the review submenu. If

you wish to store a sprite in a particular location of memory, you can use the insert option in the review submenus. This is handy for arranging animations, which can be viewed in the data movie

**If you're seriously into
sprite graphics, this
package should be
extremely interesting.**

options, and for placing 31 sprites in early memory (sprites 0-30) for use with The Game Maker.

The Game Maker is a SpryteByter bonus program that provides an excellent format for programming games on the C-64. It uses up to 31 different sprite definitions without the need for data statements for the sprites. You can even go back later and edit the games' sprites with SpryteByter and merge the updated sprite definitions back into the game when you're done.

To use The Game Maker you must follow special procedures, but they are clearly documented on the last two pages of the manual.

Advanced Basic programmers can even modify existing games to eliminate data statements for sprites by merging the program into The Game Maker format.

If you're seriously into sprite graphics, this package should be extremely interesting. It's well-written, easy to use and comes with good documentation. Retail price is \$29.95 on tape or \$34.95 on disk.

For more information, see your local dealer or write Foxfire Systems, PO Box 507, Deer Park, TX 77536.

The Last One

Soon you'll be able to buy The Last One for the Commodore-64. This program-generating software has been available for the Commodore 8032 at \$495 retail. The price of the C-64 version hasn't been announced yet.

The program produces ready-to-use, stand-alone Basic programs that are customized to your needs, but you don't have to write a single word of code.

You no longer have to ponder over which "canned" software comes closest to meeting your need, or spend thousands of dollars on custom software that only performs the tasks for which it was written. You can easily produce your own software to answer your specific needs, redesign it at will or write additional programs.

Best of all, you don't have to be a computer expert or understand Basic at all to use The Last One. You merely have to have a clear idea of what you want the program to do.

This menu-driven program shows you a list of options on the screen. From the options, you select and build a flowchart. The options lead you to submenus, which ask for more detailed or specific information. In this way, you continue until you are satisfied that your flowchart answers your requirements.

At this point, by selecting the Code Program option, The Last One will go through your flowchart line by line, asking for such information as screen layout design, branch destinations, and so on until it has a complete picture of your precise requirements.

Your program is then coded without any further effort on your part; the result is a fully coded program that requires no run-time module, includes error trapping routines and is bug free.

Finally, you can easily change or amend your finished program without fuss. The Last One automatically produces trace documentation, providing the answers to all the questions you asked while creating the program. You can update and change your program with a minimum of time and effort.

Watch for advertisements or see your local dealer for more information. The program will be distributed by Computer Marketing Services, 300 W. Marlton Pike, Cherry Hill, NJ 08002. I've been promised an evaluation copy as soon as it's out, so watch for a review.

Wordcraft Printer

Back in the July 1982 column there was a program for displaying or printing

```

5 INPUT "FILE NAME";S$: K=2
10 DOPEN#1, "P."+S$+".",D1 : OPEN 2,4
20 GET#1,Z$: IF Z$="" THEN 20
30 IF ST=64 THEN 80
35 GOTO 50
40 GET#1,Z$ : IF ST=64 THEN 80
45 IF Z$="" THEN GOSUB 200: GOTO 20
50 IF Z$=CHR$(17) THEN 40
60 IF Z$=CHR$(10) THEN Z$=CHR$(13)
70 PRINT#2,Z$;: GOTO 40
80 IF Z$=CHR$(17) THEN 95
90 PRINT#2,Z$
95 CLOSE1: CLOSE2: END
100 REM *** NEXT PAGE
200 PRINT "FEED PAPER INTO ADLER FOR PAGE"; K
210 PRINT: PRINT "HIT SPACE BAR TO CONTINUE PRINTING";
220 PRINT CHR$(7);CHR$(7)
230 GET U$: IF U$="" THEN 230
240 K=K+1: RETURN

```

Listing 1. Program for displaying Wordcraft files.

Wordcraft files that was sent in by one of our readers. Well, Michael Bertrand of Madison, WI recently sent in this version that works with the Adler typewriter.

This program (Listing 1) reads the document saved on disk in print format, suppresses the mu's CHR\$(17), and substitutes CHR\$(13) for CHR\$(10) when printing on the Adler. For more information on how to output a chapter to disk in print format, see p. 60 of the Wordcraft manual.

Commodore News

Commodore has finalized an agreement with the Minnesota Educational Computing Consortium (MECC) that provides for conversion and marketing of MECC software for the Commodore-64.

Under terms of the agreement, MECC will convert 100 programs from its library for use on the C-64 family of computers. Programs being converted fall into the following subject areas: biology, music, earth science, social studies, math, reading, nutrition, language arts, English, spelling and computer literacy.

MECC is an organization originally established to assist Minnesota schools and colleges in implementing computer-based learning. Over the past ten years, it has developed an expertise in the educational computing field while working with educators worldwide. It has applied that expertise to the development of instructional computer programs that are now part of the curriculum in thousands of American schools.

Adaptation of the MECC programs for use with the C-64 will effectively make high-quality, educational software available nationwide. For the first time, home users of Commodore computers will be

able to obtain the same software that is being used in their schools. The programs are expected to be available on floppy disk beginning in the winter of 1983.

Adaptations of the programs will make high-quality, educational software available nationwide.

They will be marketed by both Commodore and MECC through their regular distribution channels.

Commodore Goes to School

Commodore recently donated 120 computer systems to the State Department of Education in four states: California, New York, Pennsylvania and Texas. The systems include computers, data storage units, printers, modems and educational software.

The computer systems will be distributed by the State Department of Education to educational support centers where they will be used for inservice teacher training and for evaluation of instructional software. The donated units will allow states to provide teachers with hands-on training.

Commodore dealers in the area of each training center have agreed to provide support for the donated units and training for the program coordinators.

Coordinators will, in turn, instruct the states' teachers.

Disk Notes

From the July issue of the ICPUG newsletter comes more detail on disk compatibilities and a new, undocumented disk mode.

It appears any disk that has been written to on a 1540/1541 (whether it was formatted on a 1540 or a 4040) shouldn't be used in a 4040 if you intend to write to it. If you do, there is the risk that a read error will occur either at the time of writing or on a later occasion. If a disk is formatted on a 4040 drive, you can write to it on a 1540/1541 drive provided you don't attempt to write to it on a 4040 drive later.

Fortunately, Mike Todd provides a couple of simple fixes for the 4040 drives that seem to work. The first is for those using a 4040 (using DOS 2.1 or 2.2) to write to a disk which has already been written on by a 1540/1541:

```
PRINT15,"M-W";CHR$(217);CHR$(16);
CHR$(1);XHR$(8)
```

This assumes an OPEN 15,8,15 was used to set up the command channel to the drive. The above command makes the 4040 write as if it were a 1540; therefore, the resulting disks ought to be treated as if they had been written to by a 1540.

Another Fix

The second fix is for those who've already got a disk that is producing read errors, which should be ERROR 22—DATA BLOCK NOT PRESENT. It can't guarantee a successful read but

Circle 396 on Reader Service card.

EPROM PROGRAMMER & UV ERASER FOR THE 80's

515 PROGRAMS OVER 300 DEVICE TYPES

MOS (8K - 256 K, SINGLE & 3 VOLTAGES) BIPOLAR PROMS, 40 PIN MICROS

- Stand Alone
- 256K Buffer (200 ns)
- Integrated keypad
- EPROM simulation
- Fast algorithm
- Power down sockets
- Temp compensated Ref. voltages
- 16 formats & 8 baud rates
- Auto-user friendly-mode

BYTEK
COMPUTER SYSTEMS
CORPORATION



S15F \$995

OVER 26 FUNCTIONS

- Edit
- CRC Check
- Block Move
- Over Program
- Insert
- Delete
- 16 Diagnostic Functions
- And More!

(305) 994-3520

4089 S. Rogers Circle #7, Boca Raton, FL 33431



BUV-IIA \$66.50

- Heavy duty
- Safety switch
- UV indicator

BUV-IIB \$95.50

- Heavy duty
- Timer
- Safety switch
- 110/220 voltage

OTHER COMPLETE SYSTEMS

S15R (remote) \$695
S15P (4 key) \$795
S15B (bipolar) \$895
S15G (gang) \$1095

should improve the probability significantly:

PRINT

```
15,"M-W";CHRS(197);CHRS(52);  
CHRS(1);CHRS(31)
```

If a disk read operation fails, it's normally attempted automatically about ten times. The above line forces the drive to make up to 31 attempts (the maximum that it's capable of) thereby giving the drive a better chance of a successful read. Of course, the extra read attempts take time, so you may have to wait much longer for the operation to work.

When a disk is formatted, in whatever drive, each track is first erased and then each sector is written using null data. Each sector consists of a sector header that gives details of the disk ID, the track and, of course, the sector number. This is followed by a short gap and the data block itself.

The disk encodes each eight-bit byte as ten-bits when writing to the disk; there are never more than two consecutive zeros recorded. Also, ten or more consecutive ones are used as synchronizing pulses to indicate the start of a header or data block. The end of the sync bits is indicated by the first zero which follows.

Blocks and Gaps

The header block is preceded by 40 ones used as a sync pulse, then six "bytes" (60 bits) of the header. The first "byte" of the header is an identifier to tell the drive it is reading a header block and not a data block. This process is absolutely identical on the 1540 and 4040 drives.

Following the header is the header gap, another sequence of ones as the sync for the data block, and then the data block itself. After the data block, there is yet another gap, known as the tail gap, before the start of the next sector.

On the 4040, the header gap is about 90 bits long, followed by 40 sync bits. On the 1540, there are only about 80 bits of gap and 48 sync bits. The header blocks are written only during the formatting operation, but the data block (including the sync bits) is written as required.

Now assume a 4040 drive is about to write a block that has already been written on by a 1540 drive. The 4040 drive waits until it has found the correct header, waits the time needed to read about 90 bits and then writes 40 sync bits followed by the data itself. Unfortunately, the last ten bits of the gap already contain the start of the sync bits, which the 1540 had previously written.

When the 4040 reads this block, it will see these redundant sync bits and treat them as true sync bits, waiting for the first zero as a signal to start reading the block of data.

However, the start of the proper 4040 sync bits will usually be a little ragged and contain a zero or two.

The result is that the 4040 will see these as the start of the data, and proceed to read the start of the sync bits as data. The first character that it expects to see is the data block identifier; however, it doesn't see the data block identifier so it assumes the data block doesn't exist.

The raggedness of the sync pulses' start is often variable. Occasionally, this

Have you experienced problems loading VIC-generated tapes on a C-64?

will result in a zero not being found. When this happens, the end of the sequence of sync bits is identified correctly and all is well.

Bit Fixing

The second fix mentioned earlier allows sufficient attempts at reading, giving the electronics a chance to successfully identify the end of the sync pulses.

The first fix forces the 4040 to generate a shorter gap by writing 80 bits instead of 90. This will completely overwrite the original 1540 sync pulses, but then the new block has become 4040 write incompatible.

If you've ever ended up with an unclosed write file on the disk (remember the little asterisk near the file type in the directory), then all sorts of unexpected disasters can occur if you try to scratch the file. The reasons are complex, but basically you would end up with interlinked files on the disk. This means that several existing files could possibly be destroyed.

The only reliable way to eliminate any unclosed files is to perform a Validate or Collect operation. This will get rid of the file and clean up any potential disk problems. In fact, validating the disk is a wise precaution to be taken at least periodically.

All this is fine if the file you were writing was aborted deliberately, and the data was not required. However, a write file can abort for several reasons and if not closed immediately, certain operations will result in the channel being closed with no hope for closing the file. Even reading the disk directory or initializing the disk could cause problems at this point.

If the data is really needed, there is a way to possibly regain a portion of it. The secret is in an undocumented file

mode "M" that allows reading to an open write file. This lets you read the data back and save it somewhere, but you can't write it back on the same disk. You have to write it to tape, the other drive, or hold it in memory until the disk is validated.

The format of the open command for file mode M is identical to the normal open command used for sequential files, except the M is used instead of R or W:

```
OPEN 2,8,2,"O:filename.S,M"
```

You must use the regular open command instead of the DOPEN Basic 4.0 command since DOPEN doesn't support the M mode.

Once opened, the data can be read back in the normal way. The only problem is that the ST variable is not set to indicate the end of file. You have to know when the end of file has been reached, otherwise you'll start getting garbage from the same or other files if you continue to read beyond the end. You also have to remember that the last block of data would never have been written to the disk, so the data is incomplete.

The Lowdown on Loading

Have you ever experienced problems when loading VIC-20-generated tapes on a C-64? There seems to be a timing problem between the various Commodore systems. The system clock in the PET and CBM models is exactly 1 MHz, while the VIC-20 is 1.1 MHz and the C-64 is 0.98 MHz. Unfortunately, the system clock is also used for the pulse timings on the tape.

All Commodore computers are capable of handling reasonable timing discrepancies, but the difference between 1.10 and 0.98 MHz is just on the edge of this tolerance. This normally results in read errors occurring. The only solution at this time is to load programs into a PET and then re-record them.

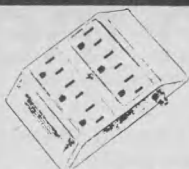
Sorry, No Response

The Program Sampler idea I presented several months ago seems to have failed before it ever got started. It appears most companies thought it was a good idea, but they didn't have sample programs available and didn't have time to produce them. There just wasn't enough response to make it worthwhile at this time. I'd like to thank those of you who wrote in asking for more information; I'll keep your names on file in case anything should develop.

Remember, I'm always willing to try to answer your questions; I also appreciate your comments or suggestions. Please include a stamped self-addressed envelope when expecting a reply; it really does help speed things up. □

SOLID STATE SURGE SUPPRESSOR

Protect against
Voltage Surge



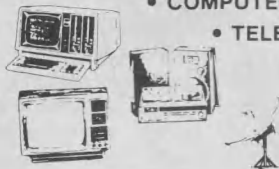
FOR USE WITH 3-WIRE GROUNDING DUPLEX OUTLETS
15 AMPS / 125 VAC / 1875 WATTS

LIGHTNING can strike miles away near power lines, or as close as down the road and cause a brief, but very Dangerous Voltage Surge.

THE CIRCUITS OF SOLID STATE ELECTRICAL EQUIPMENT CAN BE SERIOUSLY DAMAGED!

THE "SOLID STATE SURGE SUPPRESSOR" WILL PROTECT

- COMPUTERS & PERIPHERAL EQUIPMENT
- TELEVISIONS & VIDEO EQUIPMENT
- STEREOS & COMPONENTS
- SATELLITE TV EQUIPMENT



— Any electrical equipment with solid state circuitry —

VOLTAGE SURGE PROTECTION FROM

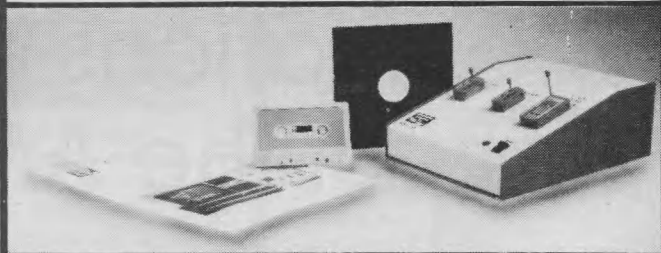
GET GENERAL
ELECTRONICS
TECHNICIANS

P.O. Box 1562
Parkersburg, WV 26101

\$29⁹⁵

Ask your Local Dealer or Call
(304) 428-1184

AFFORDABLE PROM EPROM PROGRAMMING !!!



Until now manufactures of programming equipment cost thousands of dollars. That is until now! If you can afford a Radio Shack Model III or IV you can afford a PROM/EPROM programmer! Riverlake Systems Inc. has introduced the model EP-10 PROM/EPROM programmer that connects directly to the Model III or IV 50 pin bus and programs the popular PROM types 82S23/123, 82S126/129, and 82S130/131 ALSO EPROM types 2758, 2716, 2732, 2732A, and 2764. The EP-10 comes complete with menu driven single key command software. Since we were always updating the capability send for a complete list of device capability.

\$384.95



RIVERLAKE SYSTEMS, INC.

P. O. BOX 1927

ROSWELL, GA. 30077

404-475-0028

Radio Shack * and TRS-80 * are trademarks of Tandy Corp.



VERSAWRITER GRAPHICS

WHEN WORDS AREN'T ENOUGH...

Quickly enter graphics easily with the **VersaWriter Drawing System**. Teachers, artists, engineers, programmers and hobbyists find **VersaWriter** an easy to use tool. Simply trace your drawing with the pointer arm or create exciting free hand graphics using a variety of commands which include drawing with color and brushes, color fill, text writer, and much more. The **VersaWriter** is as limitless as your imagination and is currently available for the Apple II/II+/IIfx, Atari 800, IBM PC and XT.

VersaWriter is a complete hardware/software package. \$299.00



VERSA
COMPUTING, INC.

Send for our VersaWriter brochure detailing complete graphics capabilities and other fine graphics products. Please specify computer.

3541 Old Conejo Rd. #104 • Newbury Park, CA 91320 • (805) 498-1956

Speculations on the State of the Art

I feel insightful and heretical this month. My insight tells me that things in the microcomputer industry are going to change again pretty soon and my heresy is to say that I wouldn't buy any microcomputer for the next few months, even the most popular PC. It is time again to wait and see.

I've just completed a trek through the Silicon Valley and I've been strongly impressed by some of the things I've seen. I can't give too many specifics because the companies like to do their own product release announcements, but I can point to some significant trends.

Macro View

Picture yourself positioned high above a broad river called the microcomputer industry. The two main currents in this river continue to be integrated software and faster, smaller and cheaper hardware. This isn't likely to change for the next year at least.

As the main portion of the river becomes broader and deeper, however, some interesting branches that few have foreseen or predicted are appearing.

Let's examine the mainstream first and then explore some of the new directions the current is taking.

Processors and RAMs

Throw a last spade-full of dirt on the grave of granddaddy 8080, shake your head over uncle Z-80's middle-age crisis, see the weak knees and slow reflexes emerging in brother 8088 and welcome the birth of the latest version of the superchips. This fall, you'll see a number of new systems emerge using the Intel 80186 microprocessor. This is a faster and much more compact version of the 8086.

Address correspondence to Frank J. Derfler, Jr., PO Box 691, Herndon, VA 22070.

Use of the 80186 allows manufacturers to deliver complete systems that have the CPU, memory, disk drive, and I/O in a box about the size of your two-slice kitchen toaster. These systems will use existing MS DOS and CP/M 86 operating systems and run existing and future software. The 80186 will be the CPU to beat this fall, but he has an older brother called the 80286 that will show up in wide use only a few months later.

The poor old, unloved Motorola 68000 will get a second lease on life this fall. The 68000 was chosen by Radio Shack to give 16-bit capability to the Model 16 line, but the lag between the delivery of the hardware and the availability of useful software was a disaster.

Welcome the birth of the latest version of the super chips.

However, such wise folks as Apple, Convergent Technologies and probably even AT&T will release products using the 68000 and Unix, so there might be a rebirth of interest in this powerful but lonely processor.

This group will try to pull the bookish and introverted Unix operating system out of classrooms and laboratories and send it into the world to compete with MS DOS, CP/M and the other tough kids on the block.

They're really going to have to dress up the Unix I know to make it presentable in polite company, but several manufacturers will have their Unix coming-out parties this fall. I don't know why we need yet another operating system in the industry, but it's coming.



Software

Integration is certainly the name of the game in software. VisiCorp might even be able to bring their heavily displayed and advertised but slow-to-ship VisiON integration package into the market.

In the meantime, operating system designers and application program designers are linking their programs together. The pfs software family has linked word processing, graphics, report generation and data management. Peachtree has linked word processing, spreadsheet and other support programs together into Peachtext 5000. Much, much more will come.

This integration has several good aspects and some negative ones. Users certainly benefit from having identical commands and files. Training is simplified and many different applications blend into one function, matching the way the user actually works.

But most of these integrated packages still aren't broad enough to do all of the jobs in a business office or professional environment. Professionals still need specialized applications software, but when this software is developed for authors and anesthesiologists and the like, it probably won't fit well with the integrated families in use.

The special programs may not appear on the selection menus or use the same special function keys—or even use the same file structure as the family programs.

The present integrated software families are still not a perfect solution and they might not have time to grow into one. As we'll see in a moment, the stream may suddenly reverse course, flow uphill and down or at least dampen these integrated family initiatives.

Back to Special Purpose

Just a few years ago, the state of the art was such that economics forced us to use fairly large computer systems for only one function at a time. As the technology changed, so did the economics. The technology provided powerful hardware that was still relatively high-priced, so economics forced us to share this hardware between several users with different applications. This set of circumstances caused us to use mainframe hardware with elaborate operating systems and complex time-sharing and work-queuing systems.

Further technical advances led us to lower-cost processors that could have economically served only one or two users, but the cost of peripheral devices such as printers and disk drives kept the large shared systems—like those used in word processing pools—alive. These pools of terminals clustered around high-cost peripherals prospered for a few years... then the revolution arrived.

The microcomputer revolution wasn't the result of the microprocessor alone. The revolution also had to have the disk drives, low-cost printers and other devices that made it both technically possible and economically practical for a single system to serve a single user performing relatively trivial computing chores at home or in the office.

The technology and economics of the microcomputer made it practical to have one device perform multiple functions for one person. Then we must have reached the ultimate, right? Where can we go from here? The answer is that we can go back again to special single-function devices.

Things don't stop changing in this field, at least not for very long. The economics of the multi-use, single-user machine are about to change, too.

I can confidently predict that we are about to go back to single-use special-purpose devices. Why? Because the costs of computing devices are rolling down to the point where it no longer makes sense to have a fixed desktop multipurpose system with some capabilities that are seldom used. It soon will make more economic and operational sense to have a single low-priced device that does one job well.

Which is more valuable to a real estate agent: a desktop PC in the office or a specially designed knee-top device that can be used in cars, restaurants and homes under construction?

The realtor cares little for the expansion capabilities of the system or the

potential for running Pascal and C. A small, light system with loan tables, tax tables, cost of living information and the ability to manipulate client information is all a realtor really needs. A 9x11 system about 1/2-inch deep that has an adequate keyboard, a large LCD display, a printer, specialized software in ROM and a \$700 price tag would be an excellent professional tool. It wouldn't do everything, but no one would expect it to.

You'll soon see many specialized devices designed to aid professionals in every line of work. Insurance agents, investment advisors, attorneys, law enforcement agents and many other professionals will have powerful and portable systems adapted from a basic design for their special needs. Even though these devices will contain a processor, ROM, RAM and other standard parts, they'll lose the microcomputer/personal computer image and simply become tools of the trade.

Micro or Mini?

Speaking of labels, the classification between microcomputers and minicomputers is about to change again. Authors and consultants have most recently classified a system with more than a megabyte of RAM and multi-user capabilities as a minicomputer.

This fall's generation of microcomputers will have these capabilities. I don't know how we'll make the distinction in 1984, but if we still want to call something a microcomputer, we'll have to move our classification up the scale again.

Why Such Power?

I mentioned earlier that the next generation of super chips would allow smaller packages and remarkable power. You might be tempted to ask what all that processing power will do. The 8080 did a fine job as a word processor and spreadsheet computer, so why do we need a super 80286 in a personal system?

The answer is I/O. We need to get things into and out of the machine in different ways. People are not born with the ability to read and type. But infants are able to see, and they develop language skills soon after they are born. Typing computer inputs and reading printed outputs are still unnatural acts.

We should be able to talk to our machines and see their outputs in graphic form or hear a verbal response. We are progressing rapidly in the areas of graphics and voice synthesis, but it will take bigger memories and more processing power for our systems to understand a great deal of human speech.

An improvement in the ability to communicate with people is the natural result of the growth in processing power and memory capacity in microcomputer systems. We're in for some impressive and important developments. □

Circle 17 on Reader Service card.

GLOUCESTER COMPUTER

Products for home, industry & education

PROMQUEEN Write code for most common 8-bit microprocessors, test it in circuit, and burn it on EP-ROM with this all-in-one micro development system cartridge. Powerful machine code editor provides comprehensive ROMware development support. Ideal for robotics, process control, game development. Commodore VIC-20 host computer. Programs 2716, 2732, 2758 EPROMs and similar EPROMs.



\$199.00

PROMQUEEN RS pack add RS-232 communications to Promqueen development system.

\$69.00

PQ/64 all features of Promqueen less mimic mode. Software enhanced to include EPROM QC utilities, RS-232 communication, printouts. 28 pin ZIF socket. Reads, edits

runs and programs all 5 volt 2500 and 2700 series EPROMs plus variety of EEPROMs all without personality modules. Commodore C-64 host computer.



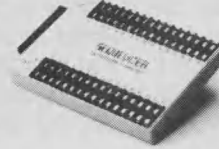
\$299.00

PQ/64 RS pack performs RS-232 voltage conversions for PQ/64 system.

\$49.00

GLOUCESTER SEQUENCER Connect the VIC or 64 to the outside world for robotics, control, sensing. 16 independent inputs, 16 independent outputs plus unique software allowing user to define 255 "finite states." Includes 3 software timers, and stepper motor driver software.

100% machine coded software for high speed. All sequencer programs and state definitions are ROMable. VIC-20 or C-64 host.



\$299.00

ROM Packs Industrial quality circuit cards are socketed, solder masked, fully bypassed, and include a ground plane for low noise operation. Includes 1 EPROM. 8K & 16K models for VIC-20 and C-64. Specify 2732 or 2764 EPROM type. Molded plastic case.

\$39.00

All products shipped with comprehensive documentation. Call our user hotline 617-283-7719 or write for information: Gloucester Computer, 1 Blackburn Center, Gloucester, MA 01930.

When Apple Gets the (Big) Blues or IBM Gets Fruity

*Are you caught between an Apple and an IBM?
The program described here will allow you to transfer data
between these two micro-giants—efficiently.*

By Jurgen Schmidt

You want to transfer files over the telephone lines between two systems. But you don't want to buy a communications program for each system. What do you do?

Well, my solution to the problem was to write my own programs to transfer data files between the Apple III and the IBM PC.

Background

I was using VisiCalc for budgeting on an Apple III at work when I bought my own IBM Personal Computer. I also had the VisiCalc program for my IBM PC. Since I did a lot of the work with the Apple III in the evenings, I wanted to transfer my programs and spreadsheets to my IBM PC so I could work on them at home.

I knew that I could not load the Apple III disks into my IBM PC and run them. Since my files were quite large, rekeying them would take me much longer than it would to design and write some programs to do the job for me. I needed an uncomplicated, efficient way to transfer the data directly from one machine to the other.

VisiCalc works in an identical fashion on the two machines, and all the commands are the same. If you list out a VisiCalc file for the same spread-

sheets on each computer, you will get identical listings.

In addition, some of the Business Basic programs I had written for the Apple III would work on the IBM PC with only minor modification. The problem is that the data is stored on the disks in a different way by each machine.

The Solution

After reviewing the hardware of both systems and comparing the features of the Business Basic that runs on the Apple III with the Basic of the IBM PC, I found the solution: Send the data from the Apple III to the IBM PC via a communications line. Since the Apple III has a built-in serial communications port and my IBM PC has the asynchronous communications adapter, I could dial into computer bulletin boards. Both computers can access these ports through their respective Basic languages.

Two simple file-copying programs are necessary to transfer data from the Apple III to the IBM PC, and they work in the following manner. Instead of copying a file from one disk to another, the Apple III program opens a disk file as the input file and the serial port as the output file. The IBM PC

program opens the serial port as input and the disk as output.

The Apple III then reads a record from the disk file and writes it to the serial port, where it goes over a cable to the IBM PC, which reads the data from the serial port and writes it to the disk. The read-write process continues until the Apple III encounters an end-of-file condition.

At this point, the Apple III sends a unique string of characters to the IBM PC to indicate the end of the transmission. Then the output file is closed, and the entire process is completed.

Hardware Connection

You must have some way of connecting the two computers so that the data can be transferred. To do this, you can purchase a modem eliminator cable from computer stores and electronics supply shops.

If you are handy with a soldering iron, you can make your own cable. You will need two DB-25 connectors—one male and one female—three pieces of bell wire at least two feet long and a soldering iron and solder. Fig. 1 shows how to make the connections. You connect the cable to the plugs in the back of each computer.

Software Connection

With the cable in hand, I connected my IBM PC to the Apple III and started writing the file transfer programs. After some trial and error, much thumbing through reference manuals and a quart or so of coffee, I had pounded out the programs for the IBM PC (Listing 1) and for the Apple III (Listing 2). The programs let trans-

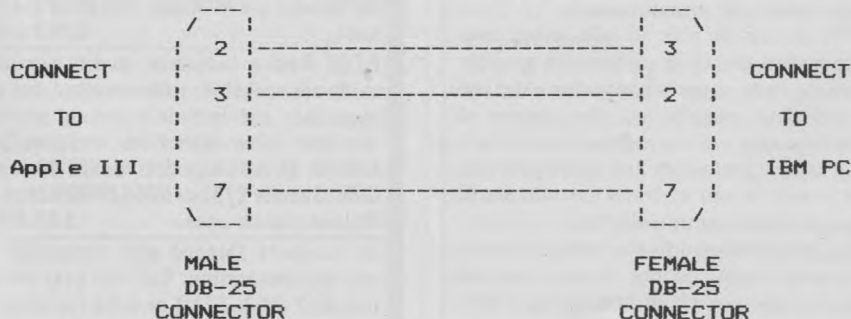


Fig. 1. Cable connecting the IBM PC and Apple III.

Address correspondence to Jurgen Schmidt, 702 West Olmos, San Antonio, TX 78212.

fers occur in either direction—from the IBM PC to Apple III and from Apple III to the IBM PC.

Program Characteristics

The IBM PC program requires DOS 1.1 Basic. The "OPEN COM1" statement lets you set and access the communications port. In the program, I disabled the automatic timeout by including the CS and DS parameters in lines 400 and 510 (see Listing 1). The reason for this will be clear in a moment.

The Apple, however, cannot configure the serial port from its Basic program. The communications parameters are determined by a file called SOS.DRIVER at boot time. This file on the boot disk contains default parameters for the serial port.

These default parameters should be 300 baud, odd parity, seven data bits and one stop bit. These parameters are used by the program on the IBM PC. You should verify this on your Apple III with the System Configuration Program (SCP).

To run the SCP, which is on your utilities disk, you will need both the Apple III user's guide and the device driver manual. If you change the SOS.DRIVER file, save the revised file on the disk, which you will use to load the transfer program.

The serial port on the Apple III is accessed from Basic via the filename ".RS232," just as you would access a disk file. This is done on lines 380 and 490 in Listing 2. This method of access does not allow for dynamic change of the communications parameters, as is possible in the "OPEN COM1" statement for the IBM PC.

Operation

When you have keyed in and saved both of the programs and verified the communications parameters for the serial port on the Apple III, you can connect the two computers with the cable that you have made or bought. Remember that even though the serial port on the Apple III is a standard item, you must install a serial adapter card in the IBM PC before the file transfer will work.

To transfer a text file, run the programs on both computers. The menu choice and dialogue must be completed on the receiving computer first so that it is ready and waiting to receive data. This is where the timeout disable is required.

If the timeout were active, the program would end with an error if there

```

100 '          A3PCXFER      IBM-PC side
110 '
120 ' Program to transmit TEXT files between
130 ' an APPLE III and the IBM-PC.
140 ' Transmission is done at 300 Baud for
150 ' reliability and to avoid resetting
160 ' defaults on the APPLE III device driver.
170 '
180 ' by Jurgen G. Schmidt      January 1983
190 '
200 '
210 KEY OFF : CLS
220 LOCATE 2,5
230 PRINT "Always set up receiving station first and then transmit."
240 PRINT " ====="
250 LOCATE 9,10 : PRINT "Choose direction of transfer:
260 LOCATE 12,10 : PRINT "      1. APPLE III -> IBM-PC
270 LOCATE 14,10 : PRINT "      2. IBM-PC -> APPLE III
280 LOCATE 16,10 : PRINT "      3. Return to BASIC(A)
290 LOCATE 18,10 : INPUT "      Enter choice: ",C
300 LOCATE 20,5
310 IF C>3 THEN GOTO 290
320 ON C GOTO 500,390,650
330 '
340 '
350 '=== transmit file to APPLE III
360 '
370 '===      the CS and DS in the OPEN "COM1:..." is to prevent timeouts.
380 '
390 INPUT "Enter filename for file to be sent : ";FILE$
400 OPEN "COM1:300,0,7,,CS,DS" AS #1
410 OPEN FILE$ FOR INPUT AS #2
420 LINE INPUT #2,A$
430 IF EOF(2) THEN GOTO 600
440 PRINT #1,A$
450 GOTO 420
460 '
470 '
480 '=== receive file from APPLE III
490 '
500 INPUT "Enter filename for file which will be received : ";FILE$
510 OPEN "COM1:300,0,7,,CS,DS" AS #1
520 OPEN FILE$ FOR OUTPUT AS #2
530 LINE INPUT #1,A$
540 IF MID$(A$,2,7)="*EOF=" THEN GOTO 610      '=== test for end-of-file tag
550 IF LEFT$(A$,1)=CHR$(13) THEN A$=MID$(A$,2)
560 PRINT #2,A$
570 GOTO 530
580 '
590 '
600 PRINT #1,"*EOF="      '=== send end-of-file tag
610 CLOSE
620 LOCATE 23,10 : PRINT " Transfer completed."
630 FOR I=1 TO 5000 : NEXT
640 GOTO 210      '=== start over
650 CLS : END

```

Listing 1. IBM PC transfer program.

Listing 2. Apple III transfer program.

```

100 REM      A3PCXFER      APPLE III side
110 REM
120 REM Program to transmit TEXT files between
130 REM an APPLE III and an IBM-PC.
140 REM The RS232 driver is configured with a
150 REM default of 300 baud. No changes should be
160 REM necessary, unless user has changed them.
170 REM
180 REM by Jurgen G. Schoidt, January 1983
190 REM
191 REM
195 HOME:PRINT:PRINT:PRINT
200 PRINT"      File to be transmitted must be on drive 1,"
205 PRINT"      the file which is received will be written on drive 1."
210 PRINT:PRINT
220 PRINT"      Choose direction of transfer:  "
225 PRINT
230 PRINT"          1.  APPLE III  ->  IBM-PC  "
235 PRINT
240 PRINT"          2.  IBM-PC    ->  APPLE III"
245 PRINT
250 PRINT"          3.  Return to BASIC"
255 PRINT
260 INPUT"      Enter choice : ";c
270 PRINT:PRINT

```

were no data coming over the line within a certain period of time. By disabling the timeout on the receiving computer, it just waits to receive data. This is only necessary on the IBM PC, since there is no timeout provision on the Apple III.

The receiving computer must be set up first because there is nothing to tell the transmitting station if the receiver is ready or not. The transmitting program sends the data regardless of the state of the receiving computer.

Once you have set up the receiving station, choose the proper menu item on the transmitting computer and complete the dialogue. The menus have been set up so that the same menu item must be chosen on each screen to achieve the proper results.

For example, if you want to transfer a file from the IBM PC to the Apple III, you first choose item 2 on the Apple III screen (see Table 1) and then enter the name under which the received file will be stored. Do not add a drive prefix, since ".D1/" will be added to the beginning of any filename used on the Apple III side so that it will default to the internal drive (see lines 360 and 475 in Listing 2).

More →

Circle 244 on Reader Service card.



Hello thayuh. This is Eben Flow, proprietor of the Fish or Cut Bait Company, buyer and seller of lobstah bait for 49 years. My hobbies are collecting linoleum samples, squashing flies and playing pac-person on my home computer.

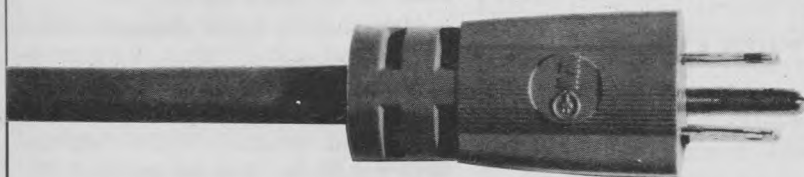
But here on Martinicus Rock, off the coast of Maine, the power can be a tad erratic. So, to cure the brownout and blackout problems, and to keep them spikes and surges off my picture tube, I got me a **MAYDAY** Uninterruptible Power Supply from SUN RESEARCH. Them fellas fixed me up real good and real light on my pocketbook, too. Got me a **MAYDAY** for my mini-calcaputer with a voltage regulator and everything for only 325 clams. They even included the battery in a nice waterproof box. Handy out here, you know. Now, if **MAYDAY** would only keep them sea dogs out of my barrel. . .

MAYDAY - Protection even you can afford!



SUN RESEARCH, INC.
Box 210
New Durham, NH 03855
603/859-7110
TWX 5102974444

Plug in your best peripheral.



Disk drives. Modems. Printers. Software. Only one source keeps you up-to-date with every innovation for microcomputers. That source is *Microcomputing*: the multi-system journal for the technical computerist.

Microcomputing's columns and articles are informative, easy-to-understand, and practical. Learn how new developments affect you. Discover the ins-and-outs of Winchester disk drives. And consider unique applications in banking, medicine, education, and business. With every issue you also get:

- extensive software listings and conversions
- advanced programming techniques for added capabilities
- powerful utilities to upgrade your system
- easy-to-do hardware modifications
- software, hardware, and book reviews that'll save you money
- new product announcements
- buyer's guides to help you get the best deal
- and publisher Wayne Green's bold editorials.

And there's more. Monthly columns cover other exciting topics in-depth. Here are just a few:

"Overview"—reveals industry trends, highlights new technologies, and examines the market impact of various products.

"Intelligent Toaster"—learn to build computer-controlled devices that speak, listen, and manipulate their own environment.

Get all this and more every month. A subscription to *Microcomputing* is only \$24.97 per year, and it's risk-free. If you aren't completely satisfied with your first issue, simply write "cancel" on the invoice and return it to us. You will owe us nothing, but please keep the first issue as our gift.



Subscribe today. Send in the coupon or attached card to: *Microcomputing*, PO Box 997, Farmingdale NY 11737. Or call us toll free:

1-800-258-5473

for even faster delivery. And if you include payment or charge it on your Mastercard, Visa, or American Express, you'll get a 13th issue FREE!

***Microcomputing* magazine. Plug it in today.**

YES! I want to plug into *Microcomputing*. Send me twelve issues for \$24.97. I understand that with payment enclosed or credit card order I will receive a free issue making a total of 13 issues for \$24.97.

☐ Check enclosed ☐ MC ☐ Visa ☐ AE ☐ Bill me

Card# _____

Exp. date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico \$27.97, 1 year only, U.S. Funds drawn on U.S. bank.
Foreign surface \$44.97, 1 year only, U.S. Funds drawn on U.S. bank.
Please allow 6-8 weeks for delivery.

MICROCOMPUTING®

PO Box 997, Farmingdale NY 11737

33NF7

Listing continued.

```

280 IF c>3 THEN GOTO 260
290 ON c GOTO 350,470,610
300 REM
310 REM
320 REM transmit file to IBM-PC
350 INPUT " Enter filename to be sent : ";file$
360 file$=".dl/"+file$
370 OPEN#1 AS INPUT,file$
380 OPEN#2 AS OUTPUT,".RS232"
390 ON EOF#1 GOTO 560
400 INPUT#1;a$
410 PRINT#2;a$
420 GOTO 400
430 REM
440 REM
450 REM receive file from IBM-PC
460 REM
470 INPUT " Enter filename for file to be received : ";file$
475 file$=".dl/"+file$
480 OPEN#1 AS OUTPUT,file$
490 OPEN#2 AS INPUT,".RS232"
500 LINE INPUT#2;a$
510 IF a$="E=EOF=" THEN GOTO 570
520 PRINT#1;a$
530 GOTO 500
540 REM

```

More

When you have entered the filename, go to the IBM PC menu (see Table 2) and choose item 2. Enter the filename and extension for the file you want to transmit.

With this completed, you should notice activity on both disk drives as indicated by the red lights. When the transfer is completed, a message will appear briefly on the screen and the menu will be refreshed.

All's Well That Ends Well

This setup has worked very well for me. I tested it by transmitting a VisiCalc file from the Apple III to the IBM PC and then loaded the received file into VisiCalc. I recalculated the spreadsheet and obtained the same results as I had on the Apple III.

After making some changes to the spreadsheet and saving it, I transmitted the file from the IBM PC back to the Apple III and loaded it back into the VisiCalc program. Again, I got the same results as I had on the IBM PC, proving that the file was transmitted successfully in each direction.

In order to transfer Basic program files, you must first save them in ASCII format. On the IBM PC this can

Circle 183 on Reader Service card.

New! A work center as efficient as your computer

At last! Computer furniture in warm traditional styling, designed to be used in the home. Finished are in antique (dark) pine. Kits come ready for assembly and finishing.

1. The Deerfield Computer Desk. Quality built of solid pine with the features you need for your personal computer system: a 44½"l x 13½"d CRT shelf at a comfortable viewing height; two 6"h x 21¾"w x 12¾"d storage compartments for disk-drive and keyboard; and a convenient wire pass-through in back. Overall: 34½"h x 48"w x 30"d. Shipped knocked down.

2. The Rolling Printer Stand. Paper feeds from the big 11¾"h x 24"w x 21¾"d shelf through a middle or back slot into your printer. The drop leaf catches print-outs. Solid pine. Sized to slip beneath the Deerfield Desk. 17"h x 25½"w x 24"d. Knocked down.

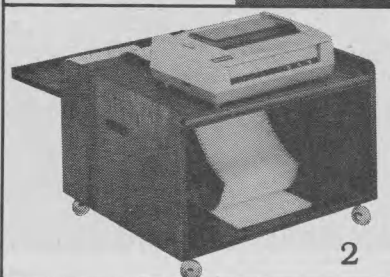
Call toll-free: 1-800-258-4720

In New Hampshire: 1-800-552-0320

Visa, MasterCard, American Express

Only \$199.⁹⁵
plus shipg.

- CRT shelf
- Disk-drive and keyboard storage
- Wire pass-through slot



2



1



Yield House®

Quality pine furniture for over 35 years
Dept. MC31 North Conway, N.H. 03860

Please send me the Deerfield Computer Desk B
— Finished #320A. \$199.95. Add \$35.00 shipping.
— Kit #320K. \$139.95. Add \$15.00 shipping.

Please send me the Rolling Printer Stand
— Finished #365A. \$139.95. Add \$12.00 shipping.
— Kit #365K. \$99.95. Add \$10.00 shipping.

— Please send me additional free information.

Name (please print)

Address

City State Zip

File to be transferred must be on drive 1, the file which is received will be written on drive 1.

Choose direction of transfer:

1. Apple III → IBM PC
2. IBM PC → Apple III
3. Return to Basic

Enter choice:

Enter filename for file to be received:

Table 1. Apple III menu for file transfer.

Always set up receiving station first and then transmit.

Choose direction of transfer:

1. Apple III → IBM PC
2. IBM PC → Apple III
3. Return to Basic(A)

Enter choice:

Enter filename to be sent:

Table 2. IBM PC menu for file transfer.

be done by including the "A" option when saving the program on disk. On the Apple III this is a little more complicated.

The procedure is described in detail in the Business Basic manual on page 33. I have included this procedure in the program lines 1000 through 1300 (see Listing 2). These lines are not executed in the normal course of running the program due to the "HOME:END" in line 610.

To produce an ASCII file of the program, load it and type "RUN 1000." You can then transmit the resulting text file, saved as "A3XFER.TEXT," to the IBM PC.

About Microcomputer Communications

These programs are essentially stripped-down versions of the communications packages that are available in a wide range of prices and complexities for both computers. What I wrote was the file upload and the file download facility, which is available in most communications programs.

Anyone familiar with data communications will notice that I have not included any type of communications protocol in my programs. This was done primarily for simplicity and because none was required.

A protocol is a software feature used by sophisticated communications to control the transfer of data. A common protocol is the XON/XOFF protocol. The receiving computer sends an XOFF character (ASCII 19) to the transmitting computer to tell it to stop

Listing continued.

```

550 REM
560 PRINT#2;"t=EOF=t"
570 CLOSE
580 PRINT:PRINT
585 PRINT"      Transfer completed."
590 FOR i=1 TO 5000:NEXT
600 GOTO 195
610 HOME:END
1000 CREATE"a3pcxfer", TEXT
1100 OPEN#1 AS OUTPUT,"a3xfer.text":OUTPUT#1
1200 LIST 100 TO 610
1300 CLOSE:END

```

transmitting. When the receiving computer is ready to accept more data, it sends an XON character (ASCII 17) to the transmitting computer and transmission continues.

The transmitting end has to monitor the communications line on a regular basis to check if an XOFF or XON character has been sent. This involves constantly switching back and forth between transmitting and receiving. I found that by transmitting at 300 baud, both disk drives could keep up with the transfer.

The drawback of transferring files

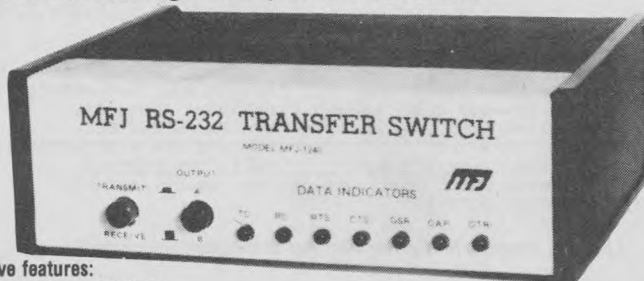
without any protocol is that the transfer speed is limited to 300 baud, or roughly 30 characters per second. For a large file, copying at this rate could be quite time consuming.

If you're an adventurous programmer, see if you can run my programs at a higher speed by adding some type of protocol. An excellent example of a program that uses the XON/XOFF protocol is the COMM.BAS program, which is on the IBM PC DOS disk. This would be an excellent starting point for further exploration into the file transfers between computers. ■

Circle 316 on Reader Service card.

RS-232 TRANSFER SWITCH

Switch your computer between printers, modems, terminals, any RS-232 peripherals. Eliminates plugging and unplugging cables. Like having extra ports. 8 models.



Exclusive features:

- LEDs monitors data lines
- Data lines spike/surge protected
- Switch reverses transmit-receive lines.

\$ 79⁹⁵

Pictured: MFJ-1240
1 in-2 out, 7x2x6 in.

These multi-function RS-232 transfer switches let you switch between peripherals, test for data and line failure, protect data lines and use as null modem for less cost than a switch alone.

Switches 10 lines (2, 3, 4, 5, 6, 8, 11, 15, 17, 20). LED data/line indicators monitor lines 2, 3, 4, 5, 6, 8, 20. Metal oxide varistors protect data lines 2, 3, 7 from voltage spikes and surges. Push button reverses transmit-receive lines. PC board eliminates wiring, crosstalk, line interference.

- MFJ-1240, \$79.95, 1 input - 2 outputs.
- MFJ-1241, \$99.95, 2 inputs - 2 outputs.
- MFJ-1242, \$119.95, 2 inputs - 3 outputs.
- MFJ-1243, \$119.95, 1 input - 4 outputs.
- MFJ-1244, \$139.95, 3 inputs - 3 outputs.
- MFJ-1245, \$169.95, 3 inputs - 5 outputs.

- MFJ-1246, \$199.95, 5 inputs - 5 outputs.
- MFJ-1247, \$99.95, 1 in-2 out (switches 20 lines)

Order from MFJ and try it. If not delighted, return within 30 days for refund (less shipping).

One year conditional guarantee.

Order yours today. Call toll free 800-647-1800.

Charge VISA, MC or mail check, money order for amount indicated plus \$4.00 each shipping.

CALL TOLL FREE ... 800-647-1800

Call 601-323-5869 in Miss., outside continental

USA, tech/repair info. Telex 53-4590 MFJ STKV.

Write or Call for FREE Catalog

MFJ ENTERPRISES

INCORPORATED

921 Louisville Rd., Starkville, MS 39759

Check the Chill

When winter arrives, the shivering you do is caused by low temperatures, but the wind chill is a factor, too. With this program, written in Microsoft Basic (the author used an SDT-100), you can have the wind chill at your fingertips.

By Mark C. Worley

With colder weather setting in, most people want to know the temperature—so they'll know how miserable they should be feeling.

Just so we know how cold it *really* is, weather reports supply "wind chill factor" information. However, nobody ever seems to explain just what *wind chill* is and why we should be bothered by it.

What's in a Wind Chill?

Simply put, the wind chill factor expresses the increased rate of heat loss caused by the wind. If it's 10 degrees Fahrenheit with a 20 mph wind blowing, the wind chill is -24 degrees, al-

though the thermometer still reads 10 degrees F. A warm car parked outside in that weather won't get any colder than 10 degrees, although it will cool off faster than it would in an enclosed area such as a garage.

Obviously, though, if you were out in that weather, it would feel much colder than what the thermometer shows. That's why the wind chill factor is used to tell you how cold it seems to be. A -24 degree wind chill can be every bit as dangerous as an air temperature of the same reading, since it will rob the body of its heat equally as well.

Heat loss is caused by convection,

radiation and conduction. For people, the wind chill effects are also modified by the type and amount of clothing worn and by the metabolism of the person. The effects of exertion cause an increase in heat production and an increase in the respiration of cold air.

Along with vaporization of sweat, the effects of the apparent wind chill will be modified by that exertion. Because of the variables involved, the effects of, for example, jogging in the cold aren't taken into consideration in the formula.

Paul Siple and Charles Passel conducted experiments on wind chill measurement during the winter of 1941 at Little America in the Antarctic. Using water in plastic cylinders under a variety of wind and temperature conditions, they arrived at this formula for wind chill factor:

$$H = (A + B \times v^{1/2} + C v) \Delta T$$

or

$$H = A + B(\sqrt{v} + C v) \Delta T$$

In this formula, H is heat loss measured in kilogram calories/m²/hour, v is the wind speed in meters per second, ΔT is the difference in degrees celsius between skin temperature of 33 and the air temperature. Constants A, B and C are 10.45, 10.00 and -1.00, respectively. The above rate of heat loss should be reduced by about 200 in bright sunlight.

The National Weather Service has adopted the above formula for its wind chill chart. For the chart, it uses a 4 mph wind as the base line because "this is roughly the wind

```

10 REM          WCHILL.BAS      A PGM TO FIGURE HEAT LOSS IN kg cal/m^2/hr.
20 REM          FORMULA: H=(10.45+10V^1/2-V)(33-T)=kg-cal/m^2/hr. heat loss
30 PRINT CHR$(12)
40 INPUT "WIND VELOCITY IN MPH";V
50 INPUT "TEMPERATURE IN °F";T:T1=T
60 INPUT "BRIGHT SUNLIGHT (Y/N)";A$
70 IF A$="Y" THEN SUN=200 ELSE SUN=0
80 V=(V*1609.35)/3600
90 TC=33-((T-32)*(5/9))
100 H=(10.45+(10*SQR(V))-V)*TC-SUN
110 PRINT:PRINT "WIND CHILL HEAT LOSS IS: ";H;"kg cal/m^2/Hr."
120 PRINT:PRINT:GOTO 40
    
```

Listing 1. Program for figuring heat loss in kilogram calories/m²/hour.

```

10 REM          WINDCHIL.BAS    A PGM TO CONVERT DRY-BULB TEMPERATURE IN °F
20 REM          AND WIND SPEED IN MPH TO APPARENT WIND-CHILL TEMPERATURE.
30 REM          FORMULA: H=(10.45+10V^1/2-V)(33-T)=kg-cal/m^2/hr. heat loss
40 PRINT CHR$(12)
50 INPUT "WIND VELOCITY IN MPH";V
60 INPUT "TEMPERATURE IN °F";T:T1=T
70 INPUT "BRIGHT SUNLIGHT (Y/N)";A$
80 IF A$="Y" THEN SUN=200 ELSE SUN=0
90 V=(V*1609.35)/3600
100 TC=33-((T-32)*(5/9))
110 H=(10.45+(10*SQR(V))-V)*TC-SUN
120 X=H-506.784:IF X<0 THEN X1=T1:GOTO 140
130 X1=50-(X/12.3):X1=INT((X1*10)+5)/10
140 PRINT:PRINT "WIND CHILL TEMPERATURE IS: ";X1;"°F"
150 PRINT:PRINT:GOTO 50
    
```

Listing 2. Program for converting dry-bulb temperature in Fahrenheit and wind speed in mph to wind chill temperature.

Address correspondence to Mark C. Worley, 1831 W. Pioneer Ave., Apt. 203, Irving, TX 75061.

speed generated by someone walking briskly under calm conditions and is the generally accepted standard wind speed for calculating equivalent temperature."

About the Programs

The program listings in Microsoft Basic will allow you to figure wind chill effects in apparent temperature or in kilogram calories heat loss per square meter per hour.

Line 40 of the Basic program Windchil.bas (Listing 2) is used to clear the screen on my terminal. Line 70 allows for a reduction in the cooling rate in bright sunlight. Line 120 checks for a heat gain, which would occur with wind speeds of less than 4 mph or with an air temperature greater than 50 degrees.

If there is an apparent heat gain, the wind chill is equated to be the actual measured temperature. Line 130 uses 50 degrees as the arbitrary reference point from which the wind chill temperature is calculated; 506.784 kg-calories per square meter are lost at 50 degrees with a wind speed of 4 mph. It's generally considered unnecessary to figure wind chill for temperatures above 50 degrees. A constant of 12.3 is used to figure the per-degree drop in temperature from that point. The final equation on line 130 rounds the wind chill temperature to the nearest whole degree.

50 mph Wind Speed

The program listing W2chill.bas (Listing 3) will print the chart shown to allow its use as a handy reference. As you can see, winds in excess of 50 mph don't increase the effects of windchill. By altering the program, you can increase the resolution to 1 or 2 mph increments, and similarly for temperatures, although such apparent accuracy is unwarranted due to the many possible variables affecting wind chill calculations.

Remarks within the programs should allow you to understand and modify them to your needs.

The results of Windchil.bas closely match the published chart to within one degree. Other charts not based on Siple's formula—and there are a lot of them—will vary by as much as ± 10 degrees.

Since the effects of wind chill are so subjective and affected by numerous variables, a few degrees of difference between different formulas is meaningless.

There are some practical applica-

tions for the wind chill index, however. For example, some cattle ranchers use it to determine the feed formulation for herds when they're

exposed to the extremes of the weather. Environmental control systems for large buildings could also find such information useful. ■

```

10 REM          W2CHILL.BAS      A PGM TO CONVERT DRY-BULB TEMPERATURE IN °F
20 REM          AND WIND SPEED IN MPH TO APPARENT WIND-CHILL TEMPERATURE.
30 REM          FORMULA: H=(10.45+10V^(1/2)-V)(33-T)=kg-cal/m^2/hr. heat loss
40 REM          UTILIZES EPSON MX-80 W/GRAFRAX PRINT-CODES FOR PRINT SIZE
50 A$="#####";B$="###"
60 LPRINT CHR$(27);"S";TAB(15)"WIND-CHILL CHART"          'EXPANDED PRINT
70 LPRINT CHR$(27);"T"          'CANCEL EXPANDED PRINT
80 LPRINT CHR$(27);"P"          'COMPRESSED PRINT FOR REST OF PRINT-OUT
90 PRINT CHR$(12)          'CLEAR SCREEN
100 PRINT:PRINT:PRINT"CALCULATING & PRINTING WIND-CHILL"
110 LPRINT TAB(60)"DRY-BULB TEMPERATURE"
120 LPRINT TAB(22);          'TABS TO CENTER THE PRINT-OUT
130 FOR T=45 TO -40 STEP -5
140 LPRINT USING A$;T;:NEXT T
150 LPRINT
160 LPRINT TAB(20)"MPH";TAB(115)"MPH"
170 FOR V=5 TO 60 STEP 5
180 LPRINT TAB(20)USING B$;V;
190 FOR T=45 TO -40 STEP -5
200 V1=(V*1609.35)/3600
210 TC=33-((T-32)*(5/9))
220 H=(10.45+(10*SQR(V1))-V1)*TC
230 X=H-17.1375
240 X1=90-(X/12.3);X1=INT(((X1*10)+5)/10)
250 LPRINT USING A$;X1;
260 NEXT T
270 LPRINT USING A$;V
280 NEXT V

```


Listing 3. W2chill.bas program for converting dry-bulb temperature in Fahrenheit and wind speed in mph to wind chill temperature.

WIND-CHILL CHART

DRY-BULB TEMPERATURE																			
MPH	45	40	35	30	25	20	15	10	5	0	-5	-10	-15	-20	-25	-30	-35	-40	MPH
5	43	38	32	27	22	17	11	6	1	-4	-9	-15	-20	-25	-30	-36	-41	-46	5
10	35	28	22	16	10	4	-2	-8	-14	-21	-27	-33	-39	-45	-51	-57	-63	-70	10
15	29	23	16	9	3	-4	-11	-18	-24	-31	-38	-44	-51	-58	-64	-71	-78	-85	15
20	26	18	11	4	-3	-10	-17	-24	-31	-38	-45	-52	-60	-67	-74	-81	-88	-95	20
25	23	15	8	1	-7	-14	-21	-29	-36	-44	-51	-58	-66	-73	-81	-88	-95	-103	25
30	21	13	6	-2	-10	-17	-25	-32	-40	-48	-55	-63	-70	-78	-86	-93	-101	-108	30
35	19	12	4	-4	-12	-19	-27	-35	-43	-50	-58	-66	-74	-81	-89	-97	-105	-113	35
40	18	10	3	-5	-13	-21	-29	-37	-45	-52	-60	-68	-76	-84	-92	-100	-108	-115	40
45	18	10	2	-6	-14	-22	-30	-38	-46	-54	-62	-70	-78	-86	-94	-102	-109	-117	45
50	17	9	1	-7	-15	-23	-31	-39	-47	-55	-63	-71	-79	-87	-95	-103	-111	-119	50
55	17	9	1	-7	-15	-23	-31	-39	-47	-55	-63	-71	-79	-87	-95	-103	-111	-119	55
60	17	9	1	-7	-15	-23	-31	-39	-47	-55	-63	-71	-79	-87	-95	-103	-111	-119	60

Table 1. Wind chill chart.

Circle 161 on Reader Service card.




GREENBRIAR


LOW PRICES

WE WANT YOUR APPLE SOFTWARE BUSINESS

<p>BANK STREET WRITER \$49.95</p> <p>ZAXXON \$31.95</p> <p>ZORK 1, 2, or 3 \$31.95</p> <p>Ohio Residents Add 5½% Sales Tax Add \$2.00-S&H; Visa, MC Welcome</p>	<p>WIZARDRY 1-\$39.95 2 or 3-\$29.95</p> <p>GRAPHICS MAGICIAN \$49.95</p>
--	---



Greenbriar
P. O. Box 795
Bryan, OH 43506



Take an Atari And Call Me in the Morning

*Staying healthy shouldn't be something
you take too lightly. With this program,
you can organize and keep track of your medical records.*

By Tim Banse

Accurate medical records can be an important health care consideration for any family. Besides being a good record-keeping practice, they can come in handy in case of sudden illness. If a family member suffers severe allergic reactions, the emergency room staff may need to know the current medications the injured party has been taking. Will you always know off the top of your head, especially in the

high-stress environment of a trauma center? On the other hand, if all you need to do is make a printout of Grandma Shelly's file, the doctor will have an easier time and you can breathe easier.

One of the advantages of having a personal computer is that the tedium of collecting and sorting such information is made easy by writing to cassette tape or disk.

The following Medical Record program (Listing 1) utilizes some of the special characteristics of the Atari home computer. Namely, the video screen is live. That means anything displayed on the screen can be read by the Atari and sent wherever you want it to go. You'll know more of what I mean in a minute.

At the onset, you have a menu giving two choices:

- Read An Existing Record.
- Create A Record.

Since we don't have any medical records yet, we'll enter a 2. That done, the screen clears and prints the medical form. At "e" is the cue to:

1. Load a blank, rewound cassette.
2. Press Play and Record buttons on the cassette recorder.
3. Hit the return key.
4. Patiently wait while the program saves the data to tape.

Once that's accomplished, the screen will clear and print the menu.

Want to check the file for accuracy or update current medications? If so:

- Rewind the cassette tape.
- Press the play button.
- Enter menu selection "1."

The screen will clear and print the medical record form. When the computer beeps, hit the return key. Then the recorder turns on and loads the

```
100 REM MEDICAL HISTORY
110 DIM NAME$(255)
120 DIM BIRTH$(28)
130 DIM ALLERGIE$(255)
140 DIM VACCINATION$(255)
150 DIM AILMENT$(255)
160 DIM BONE$(255)
170 DIM MED$(255)
180 DIM A$(14)
190 PRINT CHR$(125):REM CLEAR SCREEN
200 POKE 85,12:REM INDENT NEXT PRINT
210 A$="MEDICAL RECORD"
220 PRINT A$
230 PRINT :PRINT
240 PRINT "1.  READ RECORD"
250 PRINT :PRINT
260 PRINT "2.  WRITE RECORD"
270 PRINT :PRINT
280 PRINT "PLEASE CHOOSE  (1 OR 2)"
290 REM OPEN KEYBOARD FOR READ
300 OPEN #1,4,0,"K"
```

More →

file. In a matter of moments, the medical history will fill in all the blanks. But things are much different at this point.

Remember when I said the screen was live? You will see a quote mark prompt in front of the first character of the person's name. At this point, if you hit the return key, that name will be saved exactly as is. If the name is misspelled, use the editing keys to correct it. Once you hit return, whatever was printed on that line will be saved exactly as it was displayed on the screen.

Once you hit return, the question mark prompt jumps down to the date-of-birth line. Again, if you hit return, the line will be saved exactly as it appeared on the screen. You can add, delete or leave as is on each of the lines all the way down to the current medications line. Once you hit return after Current Medications, you will hear the familiar beep-beep. If you want to save the updated file:

- Rewind the tape to overwrite the old information.
- Press record and play buttons.
- Hit return.

Remember, an Atari a day keeps the doctor away. Sorry Apple. ■

Listing 1 continued.

```

310 REM READ KEYBOARD
320 GET #1,RESPONSE
330 REM CLOSE KEYBOARD
340 CLOSE #1
350 GOSUB 950
360 REM GO DO JOB CHOSEN
370 IF RESPONSE=49 THEN GOTO 680
380 IF RESPONSE=50 THEN GOTO 400
390 REM WRITE MEDICAL HISTORY
400 POKE 84,3
410 INPUT NAME$
420 POSITION 16,5
430 INPUT BIRTH$
440 POKE 84,8
450 INPUT ALLERGIE$
460 POKE 84,11
470 INPUT VACCINATION$
480 POKE 84,14
490 INPUT AILMENT$
500 POKE 84,17
510 INPUT BONE$
520 POKE 84,20
530 INPUT MED$
540 REM OPEN CHANNEL TO CASSETTE PLAYER
550 OPEN #1,8,0,"C:"
560 REM WRITE TO CASSETTE FILE
570 PRINT #1;NAME$

```

More →

Circle 230 on Reader Service card.

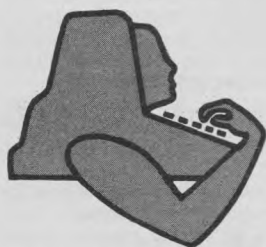
Circle 150 on Reader Service card.

UO-LISP

A LISP Programming Environment

An Excellent System for A.I., Robotics & Intelligent Systems

An Optimizing Compiler and Assembler



Documentation
Comprehensive manual covering all aspects of the system. Numerous examples of each facility are included.

Interpreter
Over 125 functions implemented in the base interpreter. Additional Development and Example Software Available.

Fast Load Libraries

Compiled code can be stored in relocatable files.

Requirements

CP/M System. Also available for TRS 80 Model I or Model III 48K dual disks.

Ordering

Systems Manual \$ 35.00
Basic System \$100.00
Development System . . . \$250.00

VISA and Mastercard

Please include expiration date and Card No.

Write for your **FREE** copy of our catalog



**FAR WEST
SYSTEMS & SOFTWARE, INC.**

P.O. Box 6582, Palo Alto, California 94305 (415) 941-0900

GENERAL SYSTEMS CONSULTING							
2312 Rolling Rock Drive Conley, Georgia 30027							
<div style="display: flex; justify-content: space-between;"> <div> </div> <div> CASSETTE SOFTWARE SINCLAIR ZX81 TIMEX SINCLAIR 1000 COMMODORE VIC20 TIMEX SINCLAIR 1500 TI 99/4A TRS80 COLOR COMMODORE 64 </div> <div> </div> </div>							
DESIGNED TO HELP MONITOR YOUR FINANCES 16K MINIMUM FOR T/S 1000 & ZX81 EXTENDED OR NON EXTENDED FOR TI & TRS80							
	ZX81 T/S 1000 T/S 1500	VIC 20	TRS 80	TI 99/4A	COMM 64	(404) 433-7143 (404) 243-7369	
* At least 3K expansion ** At least 8K expansion							
AMORTIZATIONS (LOANS)	14.95	15.95	16.95	17.95	18.95		
BAR CHARTS	15.95	**16.95	17.95	18.95	19.95		
ANNUITY EVALUATION	14.95	15.95	16.95	17.95	18.95		
FILE MANAGER	14.95	*15.95	16.95	17.95	18.95		
BANK STATEMENT BALANCER	14.95	15.95	16.95	17.95	18.95		
CHECKBOOK SIMULATOR	14.95	NA	NA	NA	NA		
DEPRECIATION STRAIGHT LINE	14.95	15.95	16.95	17.95	18.95		
DEPRECIATION DECLINE BALANCE	15.95	16.95	17.95	18.95	19.95		
DEPRECIATION ACRS	16.95	*17.95	18.95	19.95	20.95		
DIET PLAN	12.95	NA	NA	NA	NA		
HOME BUDGET	15.95	**16.95	17.95	18.95	19.95		
HOME INVENTORY	14.95	15.95	16.95	17.95	18.95		
HOME PAYABLES	14.95	NA	NA	NA	NA		
HOME EQUITY EVALUATION	14.95	15.95	16.95	17.95	18.95		
REAL ESTATE INVESTING	15.95	**16.95	17.95	18.95	19.95		
SAVINGS INVESTMENT ANALYSIS	15.95	**16.95	17.95	18.95	19.95		
IRS 1040 LONG FORM	29.95	**32.95	34.95	37.95	39.95		
IRS 1040A SHORT FORM & 1040EZ	24.95	**27.95	29.95	32.95	34.95		
INCOME TAX PROJECTIONS	16.95	**17.95	18.95	19.95	20.95		
IRA ANALYSIS	14.95	15.95	16.95	17.95	18.95		
DISK FILE CONCEPTS	NA	NA	NA	NA	29.95		
TOTAL YOUR PRICE							
NAME _____						1st CLASS POSTAGE HANDLING 3.00	
ADDRESS _____						GA. RESIDENTS 3% SALES TAX	
CITY STATE _____						ADD \$5.00 FOR DISK (COMMODORE ONLY)	
CHARGE MY: <input type="checkbox"/> VISA <input type="checkbox"/> MC						TOTAL PRICE _____	
SIGNATURE _____						CARD# _____	
MC 10-93						EXPIRATION DATE _____	

\$5.95 INFO CARDS



User Comments

- Your chart is just what I need
- Ten programmers are very happy with them.
- I have found MICRO CHART to be excellent.
- Thanks for sending so promptly.
- It is well-organized and very useful.
- Found it most helpful.
- I really found your MICRO-CHART a valuable tool.

PLEASE INQUIRE ABOUT SUBSTANTIAL EDUCATIONAL DISCOUNTS

Colorful 8 1/2" x 11" plastic MICRO CHARTS deliver data you need instantly and virtually eliminate the need to stumble through manufacturer manuals and summaries. Inexpensive MICRO CHART summaries save you unlimited time and effort.



- Instant access format
- Durable credit card plastic - lasts a lifetime
- 2 sided and incomparably comprehensive
- Perfect for programmers and engineers
- All hex data - no binary numbers
- Inexpensive - pays for itself in just days
- Clear and concise tables for full instruction set, disassembly, ASCII, base conversion, effect on flags, inequalities versus jumps, interrupt structure, pinout, cycle times, diagrams, notes, and much more
- No unfolding or multiple page turning (DEALER INQUIRIES WELCOME)

The 547400 PINOUT card covers part-number, family-type, description, and pinout in a new compact tabular format. Virtually all parts are covered.

The BASIC ALGORITHMS card gives the core of programs for sorting, searching, plotting, and some math operations plus a 3 by 5 dot-matrix character set. The algorithms are in BASIC and designed for easy conversion to Assembly.

Micro Logic Corp. (201) 342-6518
POB 174-W, Hackensack, N.J. 07602

Please ship the MICRO CHARTS selected below at \$5.95 each with your 14 day refund guarantee.

Chart	Chart Topic	# Cards	Amount
NEW VIEW		1	
ASCII		1	
BASE 2 BASE		2	
BORG THE FAMILY		1	
BASIC ALGORITHMS		1	\$1.00*
547400 PINOUTS		1	
Total Enclosed =			\$

*Overseas by air \$4.00 - \$1.00 per card

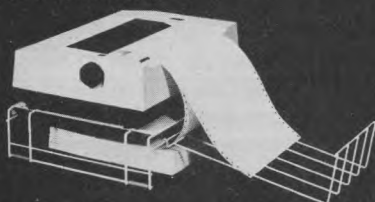
ORDER GUIDE

YOUR NAME _____
COMPANY _____
ADDRESS _____
CITY _____ STATE _____ ZIP _____

Circle 259 on Reader Service card.

TAME YOUR PRINTER!

PAPER TAMER saves space and restores order to your desktop micro center. Neatly stores 900 pp. fan-fold underneath printer. Gives perfect input feed and catches out put in special tray.



PAPER TAMER is 15 in wide x 12 1/2 in deep. Fits all popular 80 column printers. Finished in durable epoxy enamel. Cable clip included. \$35.95 + \$2.00 P/H. Money back guarantee. Free product info available.

TO ORDER Send check or money order. MN residents add 6% sales tax.

MICROMATE ACCESSORIES

5801 Duluth St. Suite 105-W
Minneapolis, MN 55422 (612)544-5327

Circle 51 on Reader Service card.

KINDER KONCEPTS

30 PROGRAMS FOR KINDERGARTEN CHILDREN.
READING READINESS, MATH CONCEPTS,
PERCEPTION, COLORS, SHAPES, ETC.

Disks \$39.50 for 5 programs*

All 30 on 1 disk with Backup — \$175.00

For COMMODORE PET® and 64,™
and APPLEII +

We also carry "Master Grades", "Multiple Choice",
"Football Scout" and other useful programs for
teachers.

Please add \$2.00 per disk for shipping & handling.

MIDWEST SOFTWARE

BOX 214 • FARMINGTON, MI 48024
Phone: 313-477-0897 (4:00 pm - 11:00 pm)

Please send for complete descriptions and ordering
information.

* Sample disk with 2 programs for \$10.00.

® and TM trademarks of Commodore Business Machines
and Apple Computer Company

Listing continued.

```

5 80 PRINT #1;BIRTH$
5 90 PRINT #1;ALLERGIES$
6 00 PRINT #1;VACCINATIONS$
6 10 PRINT #1;AILMENTS$
6 20 PRINT #1;BONES$
6 30 PRINT #1;MED$
6 40 REM CLOSE CHANNEL TO CASSETTE
6 50 CLOSE #1
6 60 REM RETURN TO MENU FOR NEXT JOB
6 70 GOTO 190
6 80 REM READ MEDICAL RECORDS
6 90 REM OPEN CASSETTE FOR READ
7 00 OPEN #1,4,0,"C:"
7 10 INPUT #1,NAME$
7 20 POSITION 1,3
7 30 PRINT NAME$
7 40 INPUT #1,BIRTH$
7 50 POSITION 17,5
7 60 PRINT BIRTH$
7 70 INPUT #1,ALLERGIES$
7 80 POSITION 1,8
7 90 PRINT ALLERGIES$
8 00 INPUT #1,VACCINATIONS$
8 10 POSITION 1,11
8 20 PRINT VACCINATIONS$
8 30 INPUT #1,AILMENTS$
8 40 POSITION 1,14
8 50 PRINT AILMENTS$
8 60 INPUT #1,BONES$
8 70 POSITION 1,17
8 80 PRINT BONES$
8 90 INPUT #1,MED$
9 00 POSITION 1,20
9 10 PRINT MED$
9 20 REM CLOSE CHANNEL TO RECORDER
9 30 CLOSE #1
9 40 GOTO 400
9 50 REM PRINT MEDICAL FORM
9 60 PRINT CHR$(125):REM CLEAR SCREEN
9 70 POSITION 12,0:REM WRITE AT TOP OF SCREEN
9 80 PRINT A$
9 90 REM USE INVERSE VIDEO
1 000 POKE 84,2
1 010 PRINT "NAME: FIRST, MIDDLE, LAST"
1 020 POKE 84,5
1 030 PRINT "DATE OF BIRTH"
1 040 POKE 84,7
1 050 PRINT "ALLERGIES"
1 060 POKE 84,10
1 070 PRINT "VACCINATIONS"
1 080 POKE 84,13
1 090 PRINT "SERIOUS AILMENTS"
1 100 POKE 84,16
1 110 PRINT "BROKEN BONES"
1 120 POKE 84,19
1 130 PRINT "CURRENT MEDICATIONS"
1 140 RETURN
    
```

Listing continued.

Everybody's making money selling microcomputers. Somebody's going to make money servicing them.

Now NRI Trains You At Home To Make Money Servicing, Repairing, and Programming Personal and Small Business Computers

Seems like every time you turn around, somebody comes along with a new computer for home or business use. And what's made it all possible is the amazing microprocessor, the tiny little chip that's a computer in itself.

Using this new technology, the industry is offering compact, affordable computers that handle things like pay-rolls, billing, inventory, and other jobs for business of every size...perform household functions including budgeting, environmental systems control, indexing recipes. And thousands of hobbyists are already owners, experimenting and developing their own programs.

Growing Demand for Computer Technicians

This is only one of the growth factors influencing the increasing opportunities for qualified computer technicians. The U.S. Department of Labor projects over a 600% increase in job openings for the decade; most of them *new* jobs created by the expanding world of the computer.

Learn At Home to Service Any Computer

NRI can train you for this exciting, rewarding field. Train you at home to service not only microcomputers, but word processors and data terminals, too. Train you at your convenience, with clearly written "bite-size" lessons that you do evenings or weekends, without going to classes or quitting your present job.

Your training is built around the latest model of the world's most popular computer. It's the amazing TRS-80™ Model 4, now with disk drive and the capabilities and features to perform a host of personal and business functions. No other small computer has so much software available for it, no other is used and relied on by so many people. And it's yours to keep for personal and business use.

You get plenty of practical experience. Under NRI's carefully planned training, you even install a *disk drive* verifying its operation at each step. Using the NRI Discovery Lab® that also comes as part of your course, you build and study circuits ranging from the simplest to the most advanced. You analyze and troubleshoot using the professional 4-function LCD digital multimeter you keep to use later in your work. Then you use the lab and meter to actually access the interior of your computer...build special circuits and write programs to control them. You "see" your computer at work and demonstrate its power.

(TRS-80 is a trademark of the Radio Shack division of Tandy Corp.)



Same Training Available With Color Computer

NRI offers you the opportunity to train with the TRS-80 Color Computer as an alternative to the Model 4. The same technique for getting inside is enhanced by using the new NRI-developed Computer Access Card. Only NRI offers you a choice to fit your specific training needs.

Become the Complete Computer Person

In addition to training in BASIC and advanced machine language, you gain hands-on experience in the operation and application of the latest computers for both business and personal jobs. You're trained to become the fully rounded, new breed of technician who can interface with the operational, programming, and service facets of all of today's computers. You're ready to take your place in the new electronic age.

Other Opportunities

NRI has been giving ambitious people new electronic skills since 1914. Today's offerings also include TV/Audio/Video Systems servicing with training on our exclusive Heath/Zenith computer-programmable 25" diagonal color TV...Industrial Electronics...Design Technology...and other state-of-the-art courses.

The Catalog is Free. The Training is Priceless.

Send the coupon for our 104-page catalog showing all courses with equipment and complete lesson plans. There's no obligation other than to yourself. See how NRI can help you take advantage of the exciting job and earning opportunities in the exploding field of microcomputers. If coupon has been removed, please write to NRI Schools, 3939 Wisconsin Ave., Washington, D.C. 20016.



NRI Schools
McGraw-Hill Continuing
Education Center
3939 Wisconsin Avenue
Washington, D.C. 20016

We'll give you tomorrow.

The catalog is free. The training is priceless.

Please check for one free catalog only.

- ☐ Computer Electronics including Microcomputers
- ☐ Color TV, Audio, and Video System Servicing
- ☐ Electronics Design Technology
- ☐ Digital Electronics
- ☐ Communications Electronics • FCC Licenses • Mobile CB • Aircraft • Marine

- ☐ Industrial Electronics
- ☐ Basic Electronics
- ☐ Small Engine Servicing
- ☐ Appliance Servicing
- ☐ Automotive Servicing
- ☐ Auto Air Conditioning
- ☐ Air Conditioning, Heating, Refrigeration, & Solar Technology
- ☐ Building Construction

All career courses
approved under GI bill.
☐ Check for details

172-113

Name (Please Print) Age

Street

City/State/Zip

Accredited by the Accrediting Commission of the National Home Study Council

Apples and Food Co-ops? Food for Thought

*Food co-operative records can be as scrambled as eggs.
In this article, the author describes how she used an Apple for
organizing incoming and outgoing orders as well as other records.*

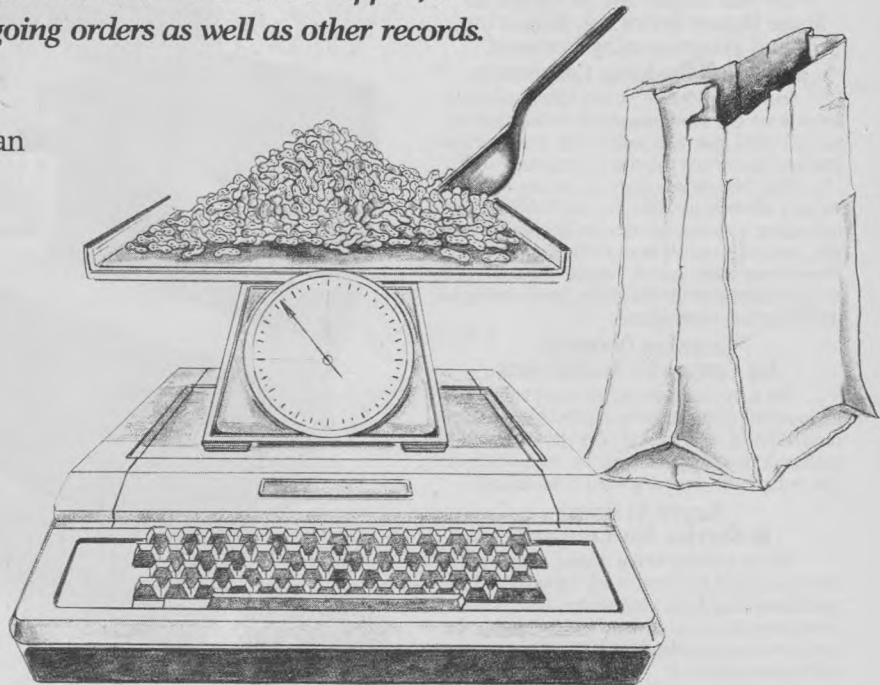
By Tobi Hoffman

Having been an Apple owner for two years and a food co-operative member for four years, I can report that the two have become good companions.

A few months after getting my computer, the responsibility of helping out with the co-op's grains order fell to me. It occurred to me that a micro-computer had potential for taking care of the various aspects of food co-op paperwork. I wrote a program to help deal with the orders. Eventually, I expanded it to handle most of the pencil-diddling in a fraction of the time it used to take.

The Problem: Paperwork

The paperwork involved in a co-op can be time-consuming.



To start with, we create an order form that lists the items available (usually between 20 to 35 different items), together with the estimate cost per unit of each item. Copies are made

and distributed to the membership.

This form is then filled in by each member, specifying the quantities wanted, possibly with a request for other things that aren't on the list. Everyone is expected to calculate how much he will owe, based on the estimated costs which include a ten to 15 percent markup to cover the co-op's costs, so that at least a partial prepayment may be made.

Next, a collator takes a few large sheets of collating forms, writes all of the items across the top and one by one transfers each order to a line, one line to a member. He then totals the columns and transfers the quantities ordered of each item to another list (providing there was enough to be able to order it—no ordering a gallon of vanilla extract if only one four-

Listing 1. Applesoft food co-op program.

```

10 REM COOP COLLATOR 10/18/82
20 REM BY TOBI HOFFMAN
30 REM 58 HILLDALE RD
40 REM ASHLAND MA 01721
50 REM (617) 881-1124
60 REM PLEASE LET ME KNOW OF ANY CHANGES YOU FIND USEFUL!
70 REM
100 DIM N1$(40),N2$(50),U$(51),X(40,50),T1(40),T2(50),P(40,50),P2(50),AC(
    50),P3(50),SH(20),P4(50)
110 REM ALL VARIABLES DIMENSIONED TO 40 REFER TO MEMBERS. THOSE DIMENSI
    ONED TO 50 REFER TO ITEMS.
120 EX = 0:D$ = CHR$(4):P1$ = D$ + "PR#1":P0$ = D$ + "PR#0"
130 DEF FN ROUND(I) = INT (100 * I + .5) / (100)
140 GOTO 300
150 FM = FN ROUND(FM):FM$ = STR$(FM)
160 IF ASC ( RIGHT$( FM$,2)) = 46 THEN FM$ = FM$ + "0"
170 IF ASC ( RIGHT$( FM$,3)) < > 46 THEN FM$ = FM$ + ".00"
180 IF LEN (FM$) < 7 THEN FM$ = CHR$(32) + FM$:GOTO 180
190 FM$ = "$" + FM$
200 PRINT FM$:
210 RETURN
220 REM SHORTAGE CALCULATION
230 T2(J) = 0
240 FOR I = 1 TO N1

```

More →

Address correspondence to Tobi Hoffman, 58 Hilldale Road, Ashland, MA 01721.

ounce unit has been requested!). From this list, he can call the order in to the warehouse.

When the order is picked up, the quantities and prices may differ from the estimates we started out with, so the actual cost, plus markup, per unit of each item must be calculated. These figures are written on each order sheet and the individual totals are figured.

Frequently, it's been impossible to order quite enough to fill all of the orders since we will not order five 50-pound bags of flour when the total order from all of the members is 213 pounds. (Items must be ordered in sufficient quantity to make buying in bulk worthwhile.) Therefore, the collating sheet is checked to see who ordered how much and who is going to get less. The order must be changed both there and on the member's sheet.

One further step is an aid to the food packers: creating a set of labels, or a list by item, for how much of each thing each member gets. By hand, it's a tedious job to write "Almonds," with the name of the member and the amount he is receiving, on each of 23 labels.

Enter: Computer

In comes the computer! I begin by deciding what items we will offer this time. By entering the markup percentage and the ordering data—item names, units (e.g., pounds, quarts or jars), minimum quantity and bulk cost per item—I generate an order sheet with the estimated cost per unit of each item. An order sheet heading, due date, pick-up date and an additional message can be put on each page. I can then either run off the order sheets on my printer or get copies duplicated.

Step #2 is up to the members; they fill in their orders and turn them in. Now I go back to the computer and retrieve the order list. Each member's name is entered, then the items ordered are entered by number. The computer prints out the item name on the screen as a check and asks for the quantity ordered. After this is entered, it gives me the price for that quantity of that item and totals these prices at the end. Since there may be "write-in" items added on to the order, the computer asks for any extras before going on to the next member.

As soon as all orders are entered, the collating sheets and a listing of the

Listing continued.

```

250 T2(J) = T2(J) + X(I,J)
260 NEXT
270 IF T2(J) > AC(J) THEN SH(Q) = J:Q = Q + 1
280 RETURN
300 HOME
310 PRINT TAB(9); "COOP COLLATOR - MENU": PRINT
320 PRINT " 1 - ENTER ITEMS"
330 PRINT " 2 - ENTER MEMBERS' ORDERS"
340 PRINT " 3 - READ FILE"
350 PRINT " 4 - WRITE FILE"
360 PRINT " 5 - CHANGE ORDERS OR ITEM LIST"
370 PRINT " 6 - ADD MORE ORDERS"
380 PRINT " 7 - PRINT ITEMS ORDERED"
390 PRINT " 8 - PRINT ITEMS RECEIVED": PRINT
400 PRINT " 9 - ENTER AMOUNTS RECEIVED"
410 PRINT "10 - CALCULATE SHORTS"
420 PRINT "11 - PRINT LISTING BY ITEM"
430 PRINT "12 - PRINT LABELS"
440 PRINT "13 - PRINT LIST OF MEMBERS & MONEY OWED"
450 PRINT "14 - PRINT ORDER FORM"
460 PRINT "15 - PRINT MEMBERS' ORDERS"
470 PRINT "16 - PRINT COLLATING FORM"
475 PRINT "17 - INPUT NEW PRICES": PRINT
480 PRINT "18 - EXIT": PRINT
490 HTAB 15: INPUT "WHICH? ";W$
500 W = VAL(W$)
510 ON W GOTO 1000,2000,3000,4000,5000,6000,7000,8000,9000,10000,11000,12
    000,13000,14000,15000,16000,1110,18000
520 GOTO 300
600 REM COST PER MEMBER CALCULATION
610 T1(I) = 0
620 FOR J = 1 TO N2
630 P(I,J) = X(I,J) * P2(J)
640 T1(I) = T1(I) + P(I,J)
650 NEXT
660 RETURN
700 FOR B = 1 TO 5: PRINT CHR$(7): NEXT: RETURN
1000 REM INPUT ITEM NAME, PRICE, UNIT
1010 HOME
1020 PRINT "FOR EACH ITEM, TYPE IN ITEM NAME AND", "UNIT, SEPARATED BY COM
    MAS, IE 'PEAS, LB'", "AND HIT RETURN. TYPE 0,0 AFTER LAST", "ITEM."
1030 J = 1
1040 PRINT J; " - "; HTAB 6
1050 INPUT N2$(J),U$(J)
1060 IF LEN(N2$(J)) > 20 THEN PRINT "PLEASE ABBREVIATE.": GOTO 1050
1070 IF N2$(J) < "0" AND J < 51 THEN J = J + 1: GOTO 1040
1080 N2 = J - 1
1090 INPUT "DO YOU WANT ESTIMATED PRICES? ";EP$
1100 IF LEFT$(EP$,1) = "N" THEN 1210
1110 REM CALCULATE ESTIMATED PRICES
1120 INPUT "% OF MARKUP: ";MU
1130 MU = 1 + MU / 100
1140 FOR J = 1 TO N2
1150 PRINT N2$(J);: HTAB 20: INPUT "MINIMUM ORDER: ";MN
1160 HTAB 29: INPUT "COST: ";C
1170 FM = (C / MN) * MU
1180 PRINT "ESTIMATED COST PER ";U$(J);: " ": GOSUB 150: PRINT
1190 P2(J) = VAL(RIGHT$(FM$,6))
1200 NEXT J
1210 REM CHECK FOR ACCURACY
1220 A = 1
1230 B = A + 5: IF B > N2 THEN B = N2
1240 FOR J = A TO B
1250 PRINT J;: HTAB 4: PRINT N2$(J);: HTAB 26: PRINT U$(J);: HTAB 32: FM =
    P2(J): GOSUB 150: PRINT
1260 NEXT
1270 INPUT "ANY CORRECTIONS? ";A$
1280 IF LEFT$(A$,1) = "Y" THEN 1310
1290 IF B < N2 THEN A = B + 1: GOTO 1230
1300 GOTO 300
1310 INPUT "WHICH ITEM TO CORRECT? ";J
1320 IF J = 0 THEN 1230
1330 PRINT "CURRENTLY: "
1340 PRINT "1 - ";N2$(J)
1350 PRINT "2 - ";U$(J)
1360 PRINT "3 - ";P2(J)
1370 INPUT "WHICH PART? (TYPE 4 IF ALL OK) ";I
1380 ON I GOTO 1400,1430,1440,1310
1390 GOTO 1370
1400 INPUT "ITEM NAME: ";N2$(J)
1410 IF LEN(N2$(J)) > 20 THEN PRINT CHR$(7); "TOO LONG!": GOTO 1400
1420 GOTO 1370
1430 INPUT "UNIT: ";U$(J): GOTO 1370
1440 INPUT "PRICE: ";P2(J): GOTO 1370
1450 IF B < N2 GOTO 1230
1460 GOTO 300
2000 REM INPUT MEMBERS, ORDERS
2010 I = 1
2020 FOR J = 1 TO N2:T2(J) = 0: NEXT
2030 PRINT : CALL - 1052: INPUT "MEMBER'S NAME: ";N1$(I)
2040 IF LEN(N1$(I)) > 14 THEN PRINT "TOO LONG - 14 LETTERS MAX": GOTO
    2030
2050 IF N1$(I) = "" THEN N2 = N2 + EX:N1 = I - 1: GOTO 300
2060 T1(I) = 0
2070 N3 = N2 + EX
2080 INPUT "ITEM # ";J
2090 IF J > N3 THEN 2200
2100 IF X(I,J) = 0 THEN 2130
2110 T1(I) = T1(I) - P2(J) * X(I,J)
2120 T2(J) = T2(J) + X(I,J)
2130 PRINT N2$(J);: INPUT X(I,J)

```

More →

Listing continued.

```

2140 TT = P2(J) * X(I,J)
2150 T2(J) = T2(J) + X(I,J)
2160 T1(I) = T1(I) + TT
2170 FM = TT
2180 HTAB 15: GOSUB 150: PRINT
2190 GOTO 2080
2200 FM = T1(I)
2210 PRINT "          TOTAL ": GOSUB 150: PRINT
2215 IF N3 = 50 THEN 2360
2220 INPUT "EXTRAS? ";A$
2230 IF LEFT$(A$,1) = "N" THEN 2340
2240 EX = EX + 1:J = N2 + EX
2250 INPUT "ITEM NAME & UNIT: ";N2$(J),U$(J)
2260 INPUT "ESTIMATED PRICE PER UNIT: ";P2(J)
2270 INPUT "AMOUNT ORDERED: ";X(I,J)
2280 TT = P2(J) * X(I,J)
2290 T1(I) = T1(I) + TT
2300 T2(J) = T2(J) + X(I,J)
2310 FM = TT
2320 HTAB 15: GOSUB 150: PRINT
2330 GOTO 2220
2340 FM = T1(I)
2350 PRINT "          GRAND TOTAL ": GOSUB 150: PRINT
2360 I = I + 1: GOTO 2030
3000 REM READ FILE
3010 INPUT "DATE OF ORDER (AS FILED): ";F$
3020 F2$ = F$ + " ITEMS"
3030 INPUT "ITEMS ONLY? ";I$
3040 IF LEFT$(I$,1) = "Y" THEN 3160
3050 F1$ = F$ + " ORDERS"
3060 PRINT D$;"OPEN";F1$
3070 PRINT D$;"READ";F1$
3080 INPUT N2,N1
3090 FOR I = 1 TO N1
3100 INPUT N1$(I)
3110 FOR J = 1 TO N2
3120 INPUT X(I,J)
3130 NEXT
3140 NEXT
3150 PRINT D$;"CLOSE";F1$
3160 PRINT D$;"OPEN";F2$
3170 PRINT D$;"READ";F2$
3180 INPUT N2
3190 FOR J = 1 TO N2
3200 INPUT N2$(J),U$(J),T2(J),P2(J)
3210 NEXT
3220 INPUT U$(N2 + 1)
3230 PRINT D$;"CLOSE";F2$
3240 GOTO 300
4000 REM FILE INFORMATION
4010 PRINT "DATE OF ORDER - MONTH NAME & NO.": INPUT "I.E. MAR 20: ";F$
4020 F1$ = F$ + " ORDERS":F2$ = F$ + " ITEMS"
4030 INPUT "ITEMS ONLY?";A$: IF LEFT$(A$,1) = "Y" THEN 4160
4040 PRINT D$;"OPEN";F1$
4050 PRINT D$;"DELETE";F1$
4060 PRINT D$;"OPEN";F1$
4070 PRINT D$;"WRITE ";F1$
4080 PRINT N2: PRINT N1
4090 FOR I = 1 TO N1
4100 PRINT N1$(I)
4110 FOR J = 1 TO N2
4120 PRINT X(I,J)
4130 NEXT
4140 NEXT
4150 PRINT D$;"CLOSE ";F1$
4160 PRINT D$;"OPEN ";F2$
4170 PRINT D$;"DELETE";F2$
4180 PRINT D$;"OPEN ";F2$
4190 PRINT D$;"WRITE ";F2$
4200 PRINT N2
4210 FOR J = 1 TO N2
4220 PRINT N2$(J)
4230 PRINT U$(J)
4240 PRINT T2(J)
4250 PRINT P2(J)
4260 NEXT
4270 PRINT U$(N2 + 1)
4280 PRINT D$;"CLOSE ";F2$
4290 GOTO 300
5000 REM CHANGE ORDERS
5010 INPUT "CHANGE 1) ORDERS, OR 2) ITEMS? ";CC
5020 ON CC GOTO 5040,1210
5030 GOTO 5010
5040 PRINT "IF ORDER # IS UNKNOWN, ENTER 99.", "TO RETURN TO MENU, ENTER 0"
5050 INPUT "ORDER # TO CHANGE: ";I
5060 IF I = 0 THEN 300
5070 IF I <= N1 THEN 5140
5080 INPUT "WHOSE ORDER TO CHANGE? ";W$
5090 IF W$ = "N" THEN 300
5100 FOR I = 1 TO N1
5110 IF N1$(I) = W$ THEN 5150
5120 NEXT
5130 PRINT "THAT PERSON DID NOT ORDER.": PRINT : GOTO 5080
5140 PRINT N1$(I)
5150 INPUT "ITEM # TO CHANGE"
: ;J
5160 IF J > N2 THEN PRINT : GOTO 5050
5170 T2(J) = T2(J) - X(I,J)
5180 PRINT N2$(J); " NOW ";X(I,J);: INPUT " CHANGE TO ";X(I,J)
5190 T2(J) = T2(J) + X(I,J)
5200 GOTO 5150

```

totals of all items ordered may be printed. The data entered can be either stored on disk or changed.

Occasionally, we'll get a last-minute order. It may be a nuisance, but with a small co-op membership—and a computer—anything's possible! I run the program, call up the past information and add in the extra order.

The Big Day Arrives

Come co-op day, one of the pick-up people calls me to tell how much of everything was shipped and how much we paid for each item. I then sit down at the computer and the program reads the disk for the data on items and orders. I enter the mark-up, the total amount received and the total price paid for each item. Now I can print a listing of items received with the unit costs.

All orders are changed to eliminate any items that were not received. The computer calculates the shortages, shows who requested the under-ordered items and lets me choose who will get less. I can't get out of this part of the program as long as there are shortages.

From here, new collating sheets, a listing by item, a set of labels for the packers, a sheet for each member showing what they are receiving, the unit prices for those items, the total cost for each item and a grand total may be printed. For the treasurer, I print a carbon copy of those sheets and a list of what each member owes with a grand total of money due.

My time spent on the actual collating job may be two to four hours for the whole process. Of course, if I were also to calculate the hours spent programming, it's another story. But that counts as fun!

You Say You Want an Evolution

The evolution of this program is probably typical of many, but I find it intriguing to delineate its development. Almost from its inception, this was a menu-driven program, and its growth amply justified this structure. There are now 17 sections in the menu, which, in the TRS-80 version, meant using two columns when putting it on the screen.

First came the input sections. I began by using Data statements for the items with the basic unit for ordering (e.g., carrots are bought by the pound and lettuce by the head), and I input the members' orders in another section, from which the information

More →

can be saved to disk.

After this input, the next important task seemed to be the generation of the collating sheet, the computer equivalent of the huge collating forms I had worked with before. Now I see that VisiCalc could have been used.

However, there seems to be little need for the spreadsheet now; it's not needed to obtain a total of the amount of each item nor to calculate shortages and which members are to be shorted. A VisiCalc setup would be different each time, as different items and different members (and different numbers of each) will be involved on each order.

The collating sheet output, which includes the totals for each item, was the first output I programmed. I tried at first to put headers for the items in that sheet, but the difficulties in printing them did not seem worthwhile. Therefore, I added a list of items ordered and the quantities, as totalled on the collating sheet, as a key. Now this "key" has superseded the collating sheet entirely and is generally printed out instead of the collating sheet.

The next step was to remove the Data statements for the item list. The first time the program is used for a particular order, I enter the items and basic unit for each and save that information to disk. I still was finding the estimated price per unit by hand and it appeared only on the order sheets, which I composed on Super-Text and not in the program at all.

Next came the extra output to help the packers: each item followed by the names of the people who ordered it and how much they were receiving. This is best for produce orders, and when I first joined the co-op, we referred to the collating sheets for this information. So again, those sheets have been superseded by the program.

A set of labels is more useful for things like grains and nuts, which are measured out and packed in plastic, paper bags or jars. They need to have more information on them, as each label needs an item name, member name and quantity. That came later, with a more recent addition to print labels for the extra amounts that we'll have of some items.

One problem a preorder co-op has at times is selling the extras; members may buy them at pick-up time, as long as they are already packaged in reasonable amounts.

The first time I printed labels with

Listing continued.

```

5210 GOTO 300
6000 REM APPEND MEMBERS, ORDERS
6010 I = N1 + 1
6020 GOTO 2030
7000 REM PRINT KEY
7010 GOSUB 700: INPUT "HIT RETURN WHEN READY. "; A$
7020 PRINT P1$
7030 HTAB 15: PRINT "TOTAL OF ITEMS ORDERED"
7040 FOR J = 1 TO N2
7050 PRINT J;: HTAB 4: PRINT N2$(J);: HTAB 26: PRINT T2(J);: HTAB 32: PRINT
    U$(J)
7060 NEXT J
7070 PRINT P0$
7080 GOTO 300
8000 REM PRINT KEY OF ITEMS/COST
8010 GOSUB 700: INPUT "HIT RETURN WHEN READY. "; A$
8020 PRINT P1$
8030 HTAB 15: PRINT "TOTAL OF ITEMS ORDERED/RECEIVED": PRINT U$(N2 + 1); "
    COST": PRINT
8040 HTAB 4: PRINT "ITEM"; TAB( 18); "COST"; SPC( 9); "+ MARKUP"; SPC( 4); "
    ORDERED EXTRA"
8050 FOR J = 1 TO N2
8060 PRINT J;: HTAB 4: PRINT N2$(J);
8070 IF AC(J) = 0 THEN HTAB 26: PRINT "NOT ORDERED": GOTO 8090
8080 HTAB 25: FM = P3(J): GOSUB 150: PRINT SPC( 3); FM = P2(J): GOSUB 150
    : PRINT "/"; U$(J);: POKE 36,50: PRINT T2(J);: POKE 36,56: PRINT AC(J)
    - T2(J)
8090 NEXT J
8100 PRINT P0$
8110 GOTO 300

9000 REM INPUT AMOUNTS RECEIVED, COST, & MARK UP, AND FIGURE UNIT PRICES
9010 FF = 1
9020 INPUT "WHAT IS THE MARK-UP? (%)" ; MU
9030 U$(N2 + 1) = "ACTUAL"
9040 MU = 1 + MU / 100
9050 PRINT "FOR EACH ITEM, ENTER THE AMOUNT", "ACTUALLY ORDERED."
9060 FOR J = 1 TO N2
9070 PRINT
9080 PRINT J; " "; N2$(J);: HTAB (25): PRINT U$(J);: INPUT AC$
9090 IF AC$ = "-" THEN GOSUB 9180: GOTO 9080
9100 AC(J) = VAL (AC$)
9110 IF AC(J) = 0 THEN 9150
9120 PRINT "PRICE PAID FOR": PRINT AC(J); " "; U$(J); " OF "; N2$(J);: HTAB 3
    0: INPUT P4(J)
9130 P3(J) = ( INT ((P4(J) / AC(J)) * 100) + .5) / 100
9140 P2(J) = ( INT ((P4(J) / AC(J)) * MU * 100) + .5) / 100
9150 NEXT J
9160 Q = 1
9170 GOTO 9280
9180 REM CORRECTION OF PRICE/QUANTITY
9190 INPUT "WHICH TO CORRECT? "; K
9200 PRINT "1 - AMOUNT RECEIVED: "; AC(K)
9210 PRINT "2 - PRICE PAID: "; P4(K)
9220 INPUT "WHICH PART (3 IF ALL OK)"; A
9230 ON A GOTO 9250,9260,9270
9240 GOTO 9220
9250 INPUT "AMOUNT RECEIVED: "; AC(K): GOTO 9200
9260 INPUT "PRICE PAID: "; P4(K): GOTO 9200
9270 RETURN
9280 REM ZERO QUANTITIES WHERE NOT ORDERED
9290 FOR J = 1 TO N2
9300 IF AC(J) > 0 THEN 9350
9310 FOR I = 1 TO N1
9320 X(I,J) = 0
9330 NEXT I
9340 T2(J) = 0
9350 NEXT J
10000 REM CALCULATE SHORTS
10010 IF FF = 0 THEN PRINT "YOU MUST INPUT AMOUNTS RECEIVED", "BEFORE CAL
    CULATING SHORTS.": CALL - 1052: GET A$: GOTO 300
10020 PRINT : Q = 1
10030 FOR J = 1 TO N2
10040 IF AC(J) > 0 THEN GOSUB 220
10050 NEXT
10060 IF Q = 1 THEN PRINT "NO SHORTS": GOSUB 700: INPUT "HIT RETURN WHEN
    READY. "; A$: GOTO 300
10070 Q = Q - 1
10080 PRINT "YOU HAVE TOO LITTLE OF "; Q; " ITEMS. ". "FOR EACH ITEM UNDER-OR
    DERED, CHOOSE", "WHOSE ORDERS SHOULD BE CHANGED."
10090 FOR J = 1 TO Q
10100 PRINT N2$(SH(J))
10110 FOR I = 1 TO N1
10120 IF X(I,SH(J)) = 0 THEN 10140
10130 PRINT I; " "; N1$(I);: HTAB 20: PRINT X(I,SH(J))
10140 NEXT I
10150 PRINT "TOTAL";: HTAB 15: PRINT T2(SH(J))
10160 PRINT "AMOUNT RECEIVED: "; AC(SH(J))
10170 INPUT "ORDER TO CHANGE? (#)" ; I
10180 IF I = 0 THEN 10220
10190 INPUT "CHANGE TO HOW MUCH? "; X(I,SH(J))
10200 GOTO 10170
10210 SH(J) = 0
10220 NEXT J
10230 GOTO 10020
11000 REM LISTING BY ITEM
11010 FOR J = 1 TO N2
11020 IF T2(J) = 0 THEN 11120
11030 GOSUB 700: INPUT "HIT RETURN WHEN READY. "; A$
11040 PRINT P1$
11050 PRINT N2$(J);: HTAB 20: PRINT U$(J): PRINT "-----"

```

More →

Listing continued.

```

11060 FOR I = 1 TO N1
11070 IF X(I,J) = 0 THEN 11090
11080 PRINT N1$(I);: HTAB 20: PRINT X(I,J)
11090 NEXT I
11100 PRINT
11110 PRINT P0$
11120 NEXT J
11130 GOTO 300
12000 REM LABELS
12010 GOSUB 700: INPUT "HIT RETURN WHEN READY.":A$
12020 PRINT P1$
12030 FOR J = 1 TO N2
12040 IF T2(J) = 0 THEN 12300
12050 FOR I = 1 TO N1
12060 IF X(I,J) = 0 THEN 12110
12070 PRINT N2$(J);: HTAB (22): PRINT N1$(I)
12080 FM = P2(J): GOSUB 150: PRINT "/";U$(J);: HTAB (22):FM = P2(J) * X(I,
J): GOSUB 150: PRINT
12090 HTAB 22: PRINT X(I,J);" ";U$(J)
12100 PRINT : PRINT : PRINT
12110 NEXT I
12120 IF AC(J) < = T2(J) THEN 12300
12130 X = AC(J) - T2(J)
12140 IF X = 0 THEN 12300
12150 PRINT P0$
12160 GOSUB 700: PRINT "THERE ARE ";X;" ";U$(J);" "; EXTRA ";N2$(J);"."
12170 INPUT "HOW MANY UNITS ON EACH LABEL? ";M
12175 IF M > X THEN PRINT "TOO MUCH": GOTO 12170
12180 INPUT "HOW MANY OF THIS SIZE? ";MM
12190 IF M * MM > X THEN PRINT "TOO MANY.": GOTO 12180
12200 PRINT P1$
12210 FOR I = 1 TO MM
12220 PRINT N2$(J);: HTAB (23): PRINT "* EXTRA *"
12230 FM = P2(J): GOSUB 150: PRINT "/";U$(J);: HTAB (23):FM = P2(J) * M: GOSUB
150: PRINT
12240 HTAB (20): PRINT M;" ";U$(J)
12250 PRINT : PRINT : PRINT
12260 X = X - M
12270 IF X < M THEN 12290
12280 NEXT I
12290 GOTO 12140
12300 NEXT J
12310 PRINT P0$
12320 GOTO 300
13000 REM PRINT MEMBERS, $ TOTALS
13010 GOSUB 700: INPUT "HIT RETURN WHEN READY.":A$
13020 PRINT P1$
13030 HTAB 10: PRINT U$(N2 + 1);" COST PER MEMBER FOR THIS ORDER": PRINT

13040 GT = 0
13050 FOR I = 1 TO N1
13060 GOSUB 600
13070 PRINT I;: HTAB 5: PRINT N1$(I);: HTAB 20:FM = T1(I): GOSUB 150
13080 PRINT
13090 GT = GT + T1(I)
13100 NEXT I
13110 PRINT : PRINT "TOTAL-----";FM = GT: GOSUB 150: PRINT
13120 PRINT P0$
13130 GOTO 300
14000 REM PRINT ORDER FORM
14010 INPUT "HEADING: ";H$
14020 INPUT "DATE DUE: ";DD$: IF DD$ = "" THEN 14040
14030 INPUT "PICKUP DATE: ";PD$
14040 INPUT "MESSAGE: ";MM$
14050 INPUT "HOW MANY COPIES? ";HM
14060 INPUT "DO YOU WANT ESTIMATED PRICES? ";EP$
14070 FOR H = 1 TO HM
14080 GOSUB 700: INPUT "HIT RETURN WHEN READY.":A$
14090 PRINT P1$: PRINT
14100 HTAB (40 - LEN (H$) / 2): PRINT H$: PRINT
14110 PRINT "NAME....."; TAB( 5);"PHONE....."
14120 IF DD$ = "" THEN 14140
14130 PRINT "DATE DUE: ";DD$: TAB( 25);"PICK-UP DATE: ";PD$
14140 PRINT MM$: PRINT
14150 PRINT "# ITEM": HTAB 25: PRINT "UNIT": HTAB 36: PRINT "EST COST"
";: POKE 36,47: PRINT "AMNT ORDERED"
14160 PRINT "-----"
14170 GOSUB 600
14180 FOR J = 1 TO N2
14190 PRINT J;: HTAB (5): PRINT N2$(J);: HTAB 26: PRINT U$(J);
14200 IF PE$ = "N" OR P2(J) = 0 THEN 14220
14210 HTAB 37:FM = P2(J): GOSUB 150
14220 PRINT
14230 IF N2 < 25 THEN PRINT : GOTO 14250
14240 IF N2 < 35 THEN PRINT CHR$( 27);"U";
14250 NEXT J
14260 PRINT "-----"
14270 PRINT : PRINT P0$
14280 NEXT
14290 GOTO 300
15000 REM PRINT MEMBERS' ORDER LISTS
15010 INPUT "TYPE ALL ORDERS? ";RR$
15020 IF LEFT$(RR$,1) = "N" THEN 15050
15030 FOR I = 1 TO N1
15040 IF LEFT$(RR$,1) = "Y" THEN 150
15050 INPUT "ORDER # TO TYPE? ";I
15060 IF I < 0 OR I > N1 THEN 300
15070 GOSUB 700: INPUT "HIT RETURN WHEN READY.":A$
15080 PRINT P1$: PRINT
15090 PRINT N1$(I): PRINT "-----"

```

this program addition, we happened to have 23 extra pounds of white flour, and there was nothing I could do to stop the program from printing 23 labels for each pound.

The program needed to be flexible to print labels for the extras in varying quantities—in this case, possibly three five-pound bags, two two-pounders and only one with one pound. This requires human input, but I have found it well worthwhile.

Treasuring Paperwork

I noticed that up to this point the computer had not been doing too much "computing," and there was still paperwork for the treasurer. When the order arrives from the warehouse, we can find out the actual price and the markup for each item (usually ten to 15 percent added by the co-op to cover its expenses.)

By this time, I had added a section to be able to change any individual order and, with the collating sheet printout, had changed orders to reflect the shortages in the shipment.

The new section now asked for the amount received of each item and the cost for that amount; using the markup figure for that order, it provided the unit prices.

I then integrated these prices in another new section to print what each member would owe for his order, with a grand total that should be coming to the treasurer on pick-up night. I amended the listing of items ordered to produce a new listing of items received, with unit costs.

Once I had the amount of each item that was actually received, it became necessary to change orders to reflect the shortages, if any. A new section went through the orders to spot the shortages, to print out the members who ordered it and to ask which orders to change. After going through all such items, it again checks if shortages still exist. As I said before, it won't let you escape back to the menu until you take care of the shortages.

Another thing the treasurer asked me to do was to give some indication to each member as to what he actually received. In precomputer times, the packers would check off each order sheet with the amount received and the unit cost, marking "N/A" if the item hadn't been ordered; the treasurer or cashier would then calculate the total cost and write that in. I already had all of the information in the computer, and needed only to output it in

More →

a usable form as individual order forms listing the items received, with the costs and grand total.

Somewhere along this process, I came across a subroutine to format columns of figures, adding zeroes and lining up decimal points, and used that wherever applicable.

The final addition to the program was another amendment of a previously existing section that seemed to bring the program full circle to the beginning of the process. The items-received-for-each-member list was easy to reorganize into a blank order sheet. When I put in the items to be ordered, I already know the minimum quantities needed of each item to be able to order it from the warehouse and what that is likely to cost.

Inputting that information provides me with everything needed to give the members an idea of what their order will cost so the order sheet could be printed out by the computer. With an estimated cost available, I added that into the members' input section and could get estimated costs per member as soon as each order was entered.

Of course, during the whole development process of this program, I gradually instituted small changes in format, cleaning up the input and output forms. I began by assuming that all item and member input would be done at a single sitting, but soon developed it into a menu-driven program and found the menu expanding eventually to 17 sections. Also, correction routines are needed at every stage, so they had to be built in. (I still can't go back and change a member's name, if it was originally misspelled!)

Originally, the member input section went through from item #1 through to the last item on the list, with no way of speeding things up (except Reset). I added an end-of-order input signal, "999," to say that no more listed items had been ordered, then another, "888," to allow me to go back to another item and correct it, or to skip from the beginning of the list to anywhere else, for that order.

Finally, I scrapped that system and changed it to ask for the item number and for how much of that item. Correction of any item amount then became much easier, and if only two items out of 30 have been ordered, only two items are entered, with no need for sidetracking

Extra! Extra!

The ability to add items to the item list became apparent early in the use

Listing continued.

```

15100 PRINT "ITEM"; HTAB 24: PRINT "AMT REC"; HTAB 32: PRINT "UNIT COST"
";: POKE 36,42: PRINT "TOTAL COST"
15110 PRINT "-----"
15120 GOSUB 600
15130 FOR J = 1 TO N2
15140 IF X(I,J) = 0 THEN 15170
15150 PRINT N2*(J); HTAB 24: PRINT X(I,J); " "; U$(J); HTAB 34: FM = P2(J)
: GOSUB 150
15160 POKE 36,44: FM = P(I,J): GOSUB 150: PRINT
15170 NEXT J
15180 PRINT "-----"
15190 HTAB 20: PRINT "GRAND TOTAL";: POKE 36,44: FM = T1(I): GOSUB 150: PRINT

15200 PRINT : PRINT P0$
15210 IF LEFT$(RR$,1) = "N" THEN 15050
15220 NEXT I
15230 GOTO 300
16000 REM PRINT TABLE, ALL MEMBERS X 10 ITEMS PER PAGE
16010 A = 1
16020 B = A + 9
16030 IF B > N2 THEN B = N2
16040 PRINT : PRINT : PRINT P0$: GOSUB 700: INPUT "HIT RETURN WHEN READY."
";A$
16050 PRINT P1$: PRINT TAB( 10);
16060 FOR J = A TO B
16070 IF J > 9 THEN PRINT TAB( 5);J;: GOTO 16090
16080 PRINT TAB( 6);J;
16090 NEXT
16100 PRINT
16110 PRINT "-----"
16120 FOR I = 1 TO N1
16130 PRINT N1*(I);: HTAB 15
16140 FOR J = A TO B
16150 C = LEN ( STR$( X(I,J - 1)))
16160 PRINT TAB( 7 - C);X(I,J);
16170 NEXT
16180 PRINT : NEXT
16190 PRINT "-----"

16200 PRINT "TOTALS"; TAB( 4);
16210 FOR J = A TO B
16220 PRINT TAB( 7 - LEN ( STR$( T2(J - 1)))): PRINT T2(J);
16230 NEXT
16240 PRINT
16250 IF B < N2 THEN A = A + 10: GOTO 16020
16260 PRINT P0$
16270 GOTO 300
16280 REM CORRECT PRICES
16290 INPUT "WHICH TO CORRECT? ";J
16300 PRINT N2*(J); " ";P2(J)
16310 INPUT "NEW PRICE: ";P2(J)
16320 GOTO 300
18000 END

```

of the program, as soon as I found that I hadn't thought of everything someone might want. It wasn't worth it to go back and change all of the Data statements, which is the stage I was in at that time, so I added the option to put in "extras" at the end of any member's order. After an extra is added, it becomes part of the item list in case anyone else also orders it.

After having come to this stage of the program, I considered marketing it with a small firm that was trying to build up a library of applications programs, but due to the limited market (co-op collators with Apples) I decided on the magazine route.

I was helping a programming class at the local high school and began translating the program from Apple-soft to TRS-80 Basic, partly as an exercise in learning the tricks of that micro. In this process, I renumbered and reorganized the Applesoft program for a more logical menu order. While I now can offer it to a wider audience in either Basic, I still wonder if it has

reached a "final" form!

Actually, it is a misnomer to say anything about a final change; last week I showed the program to the treasurer, who had a new request: make the labels reflect the costs of the items. OK, the data is already somewhere in the program, pull it out and stick it there as well!

I suspect that any new program user might find new nits to pick.

Can't Find It Everywhere

I once mentioned this program to another computer owner, a businessman who knows just enough to put a disk in the disk drive slot and follow instructions. He asked, "What database package are you using?" As I explained that I myself had written the program, he looked as impressed as if I said I'd just been to the moon!

It made me aware, however, that although this is basically a database program, the special needs that it fills just couldn't be found in a store-bought package. ■

A Touch of Braille

This short program for your PET will make the time-consuming task of learning braille easier.

By. J. J. Hoefer, P. F. Arnold and M. L. Waddell

Each year approximately 200 brailists are newly certified to transcribe various written works into raised dot patterns. For each of these, there are nearly ten others who start the program, but for one reason or another don't complete it.

Literally hundreds of hours of memorization and practice are required to attain proficiency in this demanding task. The use of this program with a PET microcomputer and a simple keypad can hopefully make the process easier and much faster.

Most beginning brailists start with a slate and stylus, in a one-dot-at-a-time mode. Unfortunately, this requires learning a reverse image of the braille characters, since they are formed from the back side of the paper. Later, as skill levels improve, the students advance to using a brailler machine, which employs the

normal image presentation.

Use of the approach described here should make the slate and stylus mode unnecessary, so the student can decide if he really wants to become a brailist without having to go through the reversed-image initiation.

Braille Detail

A cell of braille is made up of two columns of three rows of dots. For the program's purposes, the cell is assumed to be two octal numbers, one for each column of three dots. The least significant bit is the top row.

For example, the letter A in braille is a single dot in the upper left corner of the cell. This forms the octal numbers 1 and 0. We call this the braille equivalent number (BEN).

Contractions and abbreviations, of which there are nearly two hundred, are handled by using one or more

cells. The contraction for "can" is represented by the letter C and has a two digit BEN (11).

Special rules govern the use of contractions. The contraction C is not necessarily used each time the letters "c-a-n" appear together. For example, candy and cancel are transcribed using contractions for "and" and "ance." It is the brailist's function to ensure the correct use of all contractions, and this is one of the hardest processes to master.

The program randomly presents characters or letter groups to be transcribed, using three levels of difficulty. These levels are Easy, for letters and some punctuation, Medium for simple contractions and Hard for two-celled contractions. An "attaboy" is awarded whenever transcriptions are correct. If they are not, the actual character transcribed is presented, along with the correct representation.

Line 22 reads two data items at a time, the first being a character and the second its BEN. Lines 30-31 detect a switch closure, followed by a continuous loop from lines 32-43. The braille machine advances one space only when the last key is released. Consequently, the program loops until the last key is opened, meanwhile

Listing 1. The Braille Trainer program.

```
1 REM BRAILLE TRAINER
2 REM BY J.J. HOEFER
3 REM 5200 W 68 ST
4 REM SHAWNEE MSN, KS 66208
5 REM DONATED TO
6 REM PUBLIC DOMAIN
7 REM
8 GOTO15
9 P=P+1:Q=Q+1:M=M+1
10 POKEP,87:POKEQ,87:POKEM,87:RETURN
```

More →

Address correspondence to J.J. Hoefer, 5200 W. 68, Shawnee Mission, KS 66208.

THE SELECTRIC™ INTERFACE



Daisy wheel quality without daisy wheel expense.

You need the quality print that a daisy wheel printer provides but the thought of buying one makes your wallet wilt. *The Selectric™ Interface*, a step-by-step guide to interfacing an IBM Selectric I/O Writer to your microcomputer, will give you that quality at a fraction of the price. George Young, co-author of *Microcomputing* magazine's popular "Kilobaud Classroom" series, offers a low-cost alternative to buying a daisy wheel printer.

The Selectric™ Interface includes:

- step-by-step instructions
- tips on purchasing a used Selectric™
- information on various Selectric models, including the 2740, 2980, and Dura 1041
- driver software for Z80, 8080, and 6502 chips
- tips on interfacing techniques

With *The Selectric™ Interface* and some background in electronics, you can have a high-quality, low-cost, letter-quality printer. Petals not included.

ISBN 0-88006-051-4 128 pages **\$12.97**

Credit card orders call TOLL-FREE 1-800-258-5473. Or mail your order with payment plus \$1.50 shipping and handling to: Wayne Green Inc. Attn: Retail Book Sales, Peterborough, NH 03458. Dealer inquiries invited.

A Wayne Green Publication

☐ Yes, I want **The Selectric™ Interface**. Enclosed is \$12.97 (BK7388) per copy plus \$1.50 for shipping and handling.

☐ MASTER

☐ VISA

☐ AMEX

Card # _____ Expires _____

Signature _____

Name _____

Address _____

City _____

State and Zip _____

A Wayne Green Publication

All orders shipped UPS if complete street address is given.

33NR7S

SAVE 50% ON BASF



LIFETIME GUARANTEE DISKETTES

Dealer inquiries invited

5 1/4" Soft Sector	Box/10
54974 1 side/dbl dens.....	\$22.30
54980 2 sides/dbl dens.....	\$30.80
54986 1 side/quad 96 tpi.....	\$29.40
54992 2 sides/quad 96 tpi.....	\$37.80

8" Soft Sector	
54998 1 side/sgl dens.....	\$25.20
54021 1 side/dbl dens.....	\$26.60
54061 2 sides/dbl dens.....	\$34.30

Checks-VISA-MC-C.O.D./Add \$2 Shipping
Call or write for our discount catalog.

LYBEN COMPUTER SYSTEMS

27204 Harper Ave., St. Clair Shores, MI 48041
Phone: (313) 777-7780

Authorized Reseller
Information Processing Media

BASF

Circle 165 on Reader Service card.

MEMOREX SAVE 50%

ON DATA RELIABLE DISCS

Dealer inquiries invited

5 1/4" Specify Soft 10 or 16 Sector	Box/10
3481 1 side/dbl dens.....	\$22.30
3491 2 sides/dbl dens.....	\$30.70
3504 1 side/quad 96 tpi.....	\$30.00
3501 2 sides/quad 96 tpi.....	\$39.30

8" Specify Soft or 32 Sector	
3062 1 side/sgl dens.....	\$22.10
3090 1 side/dbl dens.....	\$28.90
3102 2 sides/dbl dens.....	\$33.80

Checks-VISA-MC-C.O.D./Add \$2 Shipping
Call or write for our discount catalog.

LYBEN COMPUTER SYSTEMS

27204 Harper Ave., St. Clair Shores, MI 48041
Phone: (313) 777-7780

CERTIFIED 100% ERROR-FREE

Circle 325 on Reader Service card.

DISKETTES

maxell

REG. PRICE **5 1/4"**
28.95
SOFT SECTOR

5 1/4"
39.50
SOFT SECTOR

1 Buy 2 to 4 Boxes
Get a Library Case With Ea. Box *Free*

OR

10% OFF REG. PRICE *\$4.00 VALUE*

HOLIDAY GRAB BAG

VERBATIM 5.95/00
MEMOREX 5.95/00
3M-SCOTCH 5.95/00

Add \$2.00 Handling in USA
C.O.D. 5% Tax in Fla. Only
APO/Box No's & Canada Add \$3.50 Shipping

MEGA 0 BYTE

4699 S.W. 45th Street
Ft. Lauderdale, Florida 33314
305-527-1130

1-800-327-1013

2 Buy 5 to 9 Boxes
Get a Plastic Storage Flip n File Box *Free*

OR

15% OFF REG. PRICE *\$5.00 VALUE*

3 Buy 10 Boxes
Get a Complete Computer Maintenance Kit *Free*

OR

25% OFF REG. PRICE *\$4.50 VALUE*

Listing continued.

```

11 F=VAL(F$): IFFAND1 THEN POKE P, 81
12 IFFAND2 THEN POKE Q, 81
13 IFFAND4 THEN POKE M, 81
14 RETURN
15 X=RND(-TI)
16 PRINT "DO YOU WANT EASY, MEDIUM, OR HARD?"
17 GET O$: IF O$="" THEN 17
18 N=36: W=1: Q$="EASY"
19 IF O$="M" THEN N=93: W=37: Q$="MEDIUM"
20 IF O$="H" THEN N=142: W=94: Q$="HARD"
21 A=INT((N-W+1)*RND(1)+W)
22 RESTORE: FOR I=1 TO A: READ A$, E$: NEXT
23 IF A$="" THEN 21
24 PRINT "ENTER: "; A$
25 POKE 59459, 0: REM SET PORT AS INPUTS
26 Z=0: P$="": P=32980: Q=33020: M=33060
27 REM LOOK FOR FIRST KEY CLOSURE.
28 R=0: S=0: T=0: H=0: J=0: K=0: H$=""
29 GOSUB 10: POKE P+1, 87: POKE Q+1, 87: POKE M+1, 87
30 IF PEEK(59471) AND 63 THEN 32
31 GOTO 30
32 Y=PEEK(59471)
33 REM EXIT WHEN ALL KEYS ARE UP. IF ANY
34 REM OF 6 KEYS OPERATE
35 REM STORE THAT FACT AND DISPLAY GRAPHIC.
36 IF Y=0 THEN 46
37 IF Y AND 8 THEN R=1: POKE P, 81
38 IF Y AND 16 THEN S=1: POKE Q, 81
39 IF Y AND 32 THEN T=1: POKE M, 81
40 IF Y AND 1 THEN H=1: POKE P+1, 81
41 IF Y AND 2 THEN J=1: POKE Q+1, 81
42 IF Y AND 4 THEN K=1: POKE M+1, 81
43 GOTO 32
44 REM BUILD 2 OCTAL NUMBERS IN S$.
45 REM TOTAL BEN IS IN P$
46 N1=T*4+S*2+R: N2=K*4+J*2+H
47 L$=STR$(N1): L$=RIGHT$(L$, 1)
48 N$=STR$(N2): N$=RIGHT$(N$, 1)
49 REM S$ IS BEN INPUT FROM KBD, 2 DIGITS
50 S$=L$+N$: P$=P$+S$
51 IF LEN(E$)>2 AND Z=0 THEN 71
52 IF P$=E$ THEN PRINT "CORRECT!": GOTO 72
53 RESTORE
54 IF N=93 THEN FOR I=1 TO 72: READ Z$: NEXT: GOTO 56
55 IF N=142 THEN FOR I=1 TO 186: READ Z$: NEXT
56 FOR I=WTON: READ M$, H$
57 IF H$="" THEN M$="UNKNOWN IN " + Q$: GOTO 60
58 IF P$=H$ THEN 60
59 NEXT
60 PRINT "YOUR INPUT "; M$
61 PRINT "The correct input is"
62 PRINT "THE CORRECT INPUT IS"
63 P=33300: Q=33340: M=33380: GOSUB 10
64 R$=LEFT$(E$, 2): F$=LEFT$(R$, 1): GOSUB 11
65 GOSUB 9: F$=RIGHT$(R$, 1): GOSUB 11
66 IF LEN(E$)<3 THEN 72
67 P=P+2: Q=Q+2: M=M+2: GOSUB 10
68 R$=RIGHT$(E$, 2): F$=LEFT$(R$, 1): GOSUB 11
69 GOSUB 9
70 F$=RIGHT$(R$, 1): GOSUB 11: GOTO 72
71 P=P+3: Q=Q+3: M=M+3: Z=4: GOTO 28

```

More

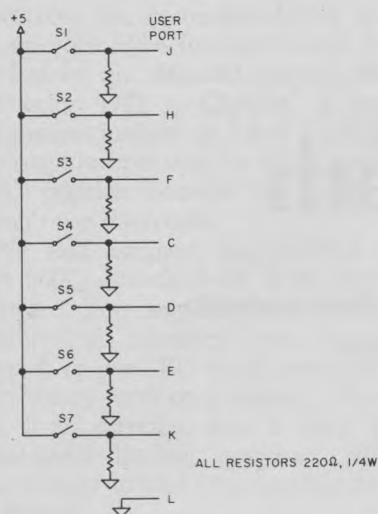
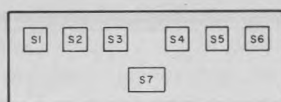


Fig. 1. Keypad wiring diagram.

storing the fact of each key closure in variables R, S, T, H, J and K. Exit takes place at line 36.

If the operator transcribes incorrectly, the data table is searched for a match with what is input, using lines 53-59. If found, the character and its cells are displayed (lines 60-70). Otherwise, an UNKNOWN message is shown. In either case, the operator is given an opportunity to continue or to quit.

The trainer is more affordable than a braille machine—training time and effort are reduced.

The keypad consists of seven normally open, spring-loaded switches wired as shown in Fig. 1. Series 320 switches from Electronic Components Groupe (26 N. Fifth, Minneapolis, MN 55043) are used.

The program is sized to allow use of a VIC-20 microcomputer, and the necessary program changes are shown in Listing 2. With the VIC-20 now selling below \$100, this paperless trainer is more affordable than a braille machine, and training time and effort are significantly reduced. ■

Listing continued.

```

72 PRINT "*****"
73 PRINT "SPACER KEY FOR MORE, ELSE <CR>"
74 FOR I=1 TO 11: GET I$: NEXT I: REM CLEAR BUFFER
75 IF PEEK(59471) AND 64 THEN 21
76 GET A$: IFA$=CHR$(13) THEN END
77 GOTO 75
78 DATA 10,B,30,C,11,D,13,E,12,F,31,G,33
79 DATA 32,I,21,J,23
80 DATA K,50,L,70,M,51,N,53,O,52,P,71,Q,73
81 DATA R,72,S,61,T,63
82 DATA U,54,V,74,W,27,X,55,Y,57,Z,56
83 DATA 40,7,41,!,62,.,26,?,64,;,60,-,44
84 DATA ":",22,",",",20,*,*
85 DATA AND,75,AR,43,AS,56
86 DATA BE,60,BL,47,BU,30,BY,46,CAN,11
87 DATA CC,22,CH,14,ED,35,EN,24,GG,66,GH,34
88 DATA COM,44,CON,22,DIS,26,DO,13,EA,20
89 DATA ER,37,EVERY,12,FF,62,FOR,77,FROM,31
90 DATA GO,33,IN,42,ING,45,NOT,53,OF,76
91 DATA TH,17,THAT,63,THE,65,TO,62,OU,36
92 DATA KNOWLEDGE,50,LIKE,70,ST,41,SH,15
93 DATA HAVE,32,HIS,64,IT,55,JUST,23
94 DATA MORE,51,OW,25,PEOPLE,71,QUITE,73
95 DATA RATHER,72,SO,61,WILL,27,WITH,67
96 DATA US,54,VERY,74,WAS,46,WERE,66,WH,16
97 DATA YOU,57,*,*
98 DATA ALLY,0457,ANCE,0512,ATION,0453
99 DATA CANNOT,0711,DAY,0213,LESS,0561
100 DATA ENCE,0612,EVER,0212,FUL,0670
101 DATA NESS,0661,SION,0553,TION,0653
102 DATA CHARACTER,0214,MENT,0663,FATHER,0231
103 DATA HAD,0732,HERE,0232,INTO,4262,ITY,0657
104 DATA KNOW,0250,LORD,0270,ONE,0252,ONG,0633
105 DATA MANY,0751,MOTHER,0251,NAME,0253
106 DATA OUGHT,0236,OUND,0513,OUNT,0563
107 DATA PART,0271,QUESTION,0273,THEIR,0765
108 DATA RIGHT,0272,SOME,0261,SPIRIT,0761
109 DATA THERE,0265,TIME,0263,UNDER,0254
110 DATA THESE,0365,THOSE,0317,THROUGH,0217
111 DATA WORD,0327,WORK,0227
112 DATA UPON,0354,WHERE,0216,WHOSE,0316
113 DATA WORLD,0727,YOUNG,0257,*,*

```

```

7 POKE 36879,110:POKE 646,1
25 POKE 37138,0
26 Z=0:P$="":P=7799:Q=7821:M=7843
30 IF PEEK(37136) AND 63 THEN 32
32 Y=PEEK(37136)
33 REM
34 REM
35 REM
63 P=7975:Q=7997:M=8019:GOSUB 10
75 IF PEEK(37136) AND 64 THEN 21

```

Listing 2. The Braille Trainer program changes for the VIC-20.

Hooked on Heath

Heath H8 owners who want to use a modem with their cassette-based system will find this article priceless.

By Leonard E. Geisler and Gerald Voorheis

This article grew out of extreme frustration. Although some readers may consider this project unnecessary, it will be valuable to a large and generally ignored segment of personal computer owners. These people generally do not have enough money to invest \$1000 for a disk system for their

This project will be valuable to a large and generally ignored segment of computer owners.

Heathkit computer. Instead, they have to make do with the more humble cassette-based system, which, although vastly slower than disk, is capable of doing about 80 percent of disk work at about 50 percent of disk's price!

Making a Permanent Connection

Until now, if you had an inexpensive telephone modem and no disk system for your H8 computer, you had to unplug the computer from the terminal and plug in the modem; then you had to reset the terminal baud rate and duplex mode to fit modem requirements. This is not only tedious, but it shortens the cable's and connector's life expectancy. I'm sure you have had nagging suspicions that it would be better if you could have terminal and modem permanently connected, relying on cassette software to do all your switching.

Now you can.

This program (Listing 1) is intended to be used with a low-priced "dumb" modem, such as the Anchor Automation Company's Signalman Mk I direct-connect unit. It should work just as well with any other direct-connect or acoustical modem with "originate" capability. It hasn't been tried with answer-only units and we

```

100.000          ORG      4000H      * PROGRAM START ADDR.
100.000 076 203    BEGIN  MUI      A,203Q  * SET DATALATCH ACCESSBIT
100.002 323 353    OUT      353Q
100.004 323 323    OUT      323Q
100.006 076 200    MUI      A,200Q  * BAUD=300
100.010 323 320    OUT      320Q  * MODEM PORT
100.012 076 001    MUI      A,001Q
100.014 323 321    OUT      321Q
100.016 076 014    MUI      A,014Q  * BAUD=9600
100.020 323 350    OUT      350Q  * TERMINAL PORT
100.022 257      XRA      A
100.023 323 351    OUT      351Q
100.025 076 003    MUI      A,003Q
100.027 323 323    OUT      323Q
100.031 323 353    OUT      353Q  * SET UP 8-BIT WORD
100.033 257      XRA      A  * DISABLE INTERRUPTS
100.034 323 321    OUT      321Q
100.036 323 351    OUT      351Q
100.040 333 355    AAA      IN      355Q  * TERM CHAR REC'D?
100.042 037      RAR
100.043 322 063 100  JNC      CCC
100.046 333 350    IN      350Q  * KEYBOARD INPUT CHAR.
100.050 365      PUSH    PSW  * STICK IT ON STACK
100.051 333 325    IN      325Q  * IS MODEM BUSY?
100.053 346 040    ANI      040Q
100.055 312 051 100  JZ       BBB  * YES, CHECK AGAIN
100.060 361      POP     PSW  * NO, SEND CHAR TO MODEM
100.061 323 320    OUT      320Q
100.063 333 325    IN      325Q  * MODEM CHAR. REC'D?
100.065 037      RAR
100.066 322 040 100  JNC      AAA
100.071 333 320    IN      320Q  * MODEM INPUT CHAR.
100.073 365      PUSH    PSW  * PUT IT ON STACK
100.074 333 355    IN      355Q  * IS TERM. BUSY?
100.076 346 040    ANI      040Q
100.100 312 074 100  JZ       DDD  * YES, CHECK AGAIN
100.103 361      POP     PSW  * NO, SEND CHAR TO TERM
100.104 323 350    OUT      350Q
100.106 303 040 100  JMP     AAA  * LOOP UNTIL POWER-DOWN
100.111          END      BEGIN  * DO IT AGAIN!

```

Listing 1. 8080 assembly language program for the H8.

Address correspondence to Leonard E. Geisler, 895 Starwick Drive, Ann Arbor, MI 48105.

make no claims that it will work with such units.

The program is written in 8080 Assembly Language and is assembled using Heath's Cassette HASL-8, Issue #4.030.00. We recommend that you set up your H8-4 four-port serial I/O card as we did: Modem plugged onto connector DTE-2, Channel 2 port assignment jumpers at 3 and 2 (320Q). Interrupt jumper may be left at center "off" position because the program doesn't use interrupts.

We also assigned the terminal to port 350Q—standard for most Heath software. You may key the program directly into memory from the H8 keypad, or use TED-8 and reassemble it in binary form on a cassette. If you key it in directly, save a copy for subsequent loading purposes; it is much easier to load from cassette than by keypad!

Once you've connected with your network, the program makes the H8 act as if there were a direct connection between modem and terminal

Please note that this program is for use only with a serial board, such as the H8-4. It must be rewritten to match parameters of any other I/O board.

Getting It Going

To use the program, simply turn on the computer and follow usual cassette loading procedure. When the H8 horn beeps, press GO on keypad and tap terminal shift and reset keys simultaneously to rest the terminal. Now dial up your local network telephone number. The terminal prints random characters as the phone dial returns to "home" position from each digit you've dialed. This shows you the program is up and running.

Once you've connected with your network, the program makes the H8 act as if there were a direct connection between modem and terminal. When you're finished using the modem program, simply load the next program over it and it will be wiped out—but you still have it on cassette for next time.

Happy networking! ■

Circle 67 on Reader Service card.

Put your Micro on IBM's level

Now you can communicate with the IBM world with Innovative Data Technology's 1/2" magnetic tape peripherals.

Popular configurations and optimum performance for most small systems that feature industry-standard interfaces, rapid data transfer rates, full operating and command subsets and a wide selection of models and configurations. IDT's magnetic tape subsystems provide economical and reliable data/program interchange, 40M bytes of storage and disc back-up. All IDT subsystems come complete and include tape transport, formatter, intelligent controller, computer resident coupler, cables, documentation and software.

But most importantly, they help put your system in touch with the IBM universe.



O.E.M., dealer/distributor discounts available.



4060 Morena Blvd. · San Diego, CA 92117
(619) 270-3990 · TWX: (910) 335-1610

Eastern Regional Office:

P.O. Box 1093 · McLean, VA 22101-1093
(703) 821-1101 · TWX: (710) 833-9888

IBM is a trademark of International Business Machines Corp.
Apple is a trademark of Apple Computer Inc.
TRS-80 is a trademark of the Tandy Corporation.

Circle 345 on Reader Service card.



COMMUNICATIONS SOFTWARE

WHY BUY 3 PROGRAMS? LYNCO HAS ALL 3 IN ONE!

- 1) FILE TRANSFER
- 2) REMOTE OPERATION
- 3) COMMUNICATE WITH TIME-SHARE

Easy set up on most systems.

Menu driven install program.

Command Mode of operation

Help Screen for Lync & Term



Z80 based CP/M \$155 PC DOS \$155 TRSDOS \$75

We're Not the Biggest, Just the Best.

**International Software Alliance (805) 966-3077
1835 Mission Ridge Santa Barbara, CA 93103**

DEALER AND OEM INQUIRIES INVITED

FORMATS: 8" Standard; IBM PC DOS; TRS-80 Mod II with CP/M; VectorGraphic; Cromemco; North Star; Osborne; Xerox 820 (8" or 5"); SuperBrain; NLS KayPro; TeleVideo; TRS-80 Model I or III; Zenith/Heathkit; Victor 9000; Sanyo; Altos; Fujitsu; Otrona.

CP/M is a trademark of DIGITAL RESEARCH. LYNCO is a trademark of MIDNIGHT SOFTWARE.

A Story of Sorts

The author needed a sorting program for his IBM PC, so he did it himself. This article describes the trials and tribulations of writing your own sort utility—and it's not as fun as it sounds.

By Mark Johansen

When I first started working with an IBM PC, I naively expected a sort utility to come with the disk operating system (having been raised on large mainframe systems). But of course, this wasn't the case. Somewhat to my surprise, I couldn't find any sort programs on the market that weren't a part of some large (read: expensive) database package.

A Future of Sorts

I managed to "do without" for all of six weeks before a project that required

a disk file to be sorted came along. I decided to write a utility rather than a program dedicated just to the application at hand; no doubt I would be needing more sorts in the future.

The requirements were straightforward: the program had to take an input disk file, sort it by any combination of fields within each record and produce an output file—all within an acceptable period of time.

I decided that the utility should deal only with random access files because there are logical problems inherently

involved with sorting sequential files. I also didn't consider files that spanned more than one floppy.

My first attempts involved setting up a workfile on disk, where I kept intermediate lists as I passed through trying to sort the records. This turned out to be too slow. Even the most efficient sorting algorithms I could find or devise involved several passes through the file, and disk I/O is time-consuming. Also, I had to jump back and forth between records, causing the access heads to move frequently.

The obvious alternative was to do the sort in RAM. Unfortunately, Basic on the IBM PC can access only 64K, regardless of how many memory boards are plugged in. Normally, this isn't much of a limitation, but it's enough so that I couldn't confidently say that I could load the entire file into RAM and sort it there: a file exceeding 64K is easy to imagine. I experimented by sorting pieces of the file in RAM and putting them together using disk work files, but this was slow.

Problem-Solving

The solution I devised was to load only the fields actually being used to sort on, along with a record identifier, into RAM, to sort these and then to use the record identifiers to pick up the correct records from the input file and write them to the output file in the desired order. This approach imposes one sharp limitation: the program has to be memory-efficient.

Most of the time-efficient sorting algorithms I know of were eliminated because they require that intermediate lists be kept before producing the final sorted order or that additional pointers be kept. However, since the entire list would be stored in internal

Listing 1. Sort utility program.

```
1 REM INSORT -- sort utility
5 KEY 1,"CLS:LIST "
10 DEFINT A-Z
20 INPUT "input file";STIN$
30 INPUT "output file";STOUT$
40 INPUT "record length";LRECL
50 IF LRECL>2550 THEN PRINT"?record length may not exceed 255"
50:END
70 DIM KF(10),KS(10),KL(10):KLT=0:KX=1
80 INPUT "key start loc";KS(KX)
90 IF KS(KX)=0 THEN KZ=KX-1:GOTO 200
100 IF KS(KX)>LRECL THEN PRINT"?key must start within record"
100:END
110 KF(KX)=INT((KS(KX)-1)/255):KS(KX)=KS(KX)-KF(KX)*255
120 INPUT "key length";KL(KX)
130 KLT=KLT+KL(KX):IF KLT>255 THEN PRINT"?total of key lengths may not exceed 255":END
140 IF KL(KX)+KS(KX)>255 THEN KLH=KL(KX):KL(KX)=255-KS(KX):KX=KX+1:KF(KX)=KF(KX-1)+1:KS(KX)=1:KL(KX)=KLH-KL(KX-1)
150 IF KX<10 THEN KX=KX+1:GOTO 80
200 DIM IREC$(9),FL(9)
210 WLEN=LRECL:FX=0
220 IF WLEN>=255 THEN FL(FX)=255:WLEN=WLEN-255:FX=FX+1:GOTO 220
230 FL(FX)=WLEN:FZ=FX
240 OPEN "B:"+STIN$ AS #1 LEN=LRECL
250 FIELD 1,FL(0) AS IREC$(0),FL(1) AS IREC$(1),FL(2) AS IREC$(2),FL(3) AS IREC$(3),FL(4) AS IREC$(4),FL(5) AS IREC$(5),FL(6) AS IREC$(6),FL(7) AS IREC$(7),FL(8) AS IREC$(8),FL(9) AS IREC$(9)
260 EOFI$=STRING$(FL(1),0)
270 RZ=50000/(KLT+5)
280 DIM K$(RZ),R(RZ)
300 REM read sortin
305 PRINT "...reading input file"
310 RN=1
320 IF RN>RZ THEN PRINT"?exceeds limit of";RZ;"records":END
```

More

Address correspondence to Mark Johansen, 15288 Moyer Road, Gerantown, OH 45327.

COMMODORE 64

(more power than Apple II at half the price)

\$99.50*

- 170K DISK DRIVE \$159.00*
- TRACTION FRICTION PRINTER \$119.00*

(* with software savings applied)

COMMODORE 64 COMPUTER \$99.50

You pay only \$199.50 when you order the powerful 84K COMMODORE 65 COMPUTER! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your computer that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net computer cost is \$99.50!!

SOFTWARE BONUS PACK \$29.95

When you buy the Commodore 64 Computer from Protecto Enterprises you qualify to purchase ONE SOFTWARE BONUS PACK for a special price of \$29.95!! Normal price is \$49.95 (40 programs on disk or 24 programs on 5 tapes).

170 DISK DRIVE \$159.00

You pay only \$259.00 when you order the 170K Disk Drive! LESS the value of the SPECIAL SOFTWARE COUPON we pack with your disk drive that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied, your net disk drive cost is \$159.00.

TRACTION FRICTION PRINTER \$119.00

You pay only \$219.00 when you order the Comstar T/F deluxe line printer that prints 8 1/2 x 11 full size, single sheet, roll or fan fold paper, labels etc. 40, 66, 80, 132 columns. Impact dot matrix, bi-directional, 80 CPS. LESS the value of the SPECIAL SOFTWARE COUPON we pack with your printer that allows you to SAVE OVER \$100 off software sale prices!! With only \$100 of savings applied your net printer cost is only \$119.00.

80 COLUMN BOARD \$149.00

You pay only \$149.00 for this 80 Column Board. Included with this board is word processor pack, electronic spread sheet and mail merge data base on two tapes. List \$249.00. (Disk add \$10.00).

80 COLUMN WORD PROCESSING PACKAGE \$79.00

SCRIPT 64 EXECUTIVE WORD PROCESSOR is the finest available for the COMMODORE 64 Computer! THE ULTIMATE for PROFESSIONAL wordprocessing application. DISPLAYS 80 COLUMNS IN COLOR. Featuring simple operation, powerful text editing with a customized 250 word dictionary, complete cursor and insert/delete key controls, line and paragraph insertion, automatic deletion, centering, margin settings and output to all printers. Included is a powerful MAIL MERGE When used with THE COMPLETE DATA BASE PACKAGE. List \$99.00. Sale \$79.00. Coupon Price \$52.00. (Disk only).

COMPUTER AND SOFTWARE CHRISTMAS SALE

WE
HAVE
THE
BEST
SERVICE

WE
HAVE
THE
LOWEST
PRICES

SPECIAL SOFTWARE COUPON

We pack a SPECIAL SOFTWARE COUPON with every COMMODORE 64 COMPUTER-DISK DRIVE-PRINTER-MONITOR we sell! This coupon allows you to SAVE OVER \$100 OFF SALE PRICES! \$200-\$300 savings are possible!! (example)

PROFESSIONAL SOFTWARE COMMODORE 64

Name	List	Coupon
Executive Word Processor	\$99.00	\$52.00
Complete Data Base	\$89.00	\$46.00
Electronic Spreadsheet	\$89.00	\$46.00
Accounting Pack	\$69.00	\$32.00
Total 5.2 Word Processor—Plus		
Tape	\$69.00	\$37.00
Disk	\$79.95	\$42.00
Total Text 2.6 Word Processor—		
Tape	\$44.95	\$26.00
Disk	\$49.95	\$26.00
Total Label 2.6	\$24.95	\$12.00
Disk	\$29.95	\$15.00
Quick Brown Fox Word Processor	\$69.00	\$40.00
Programmers Reference Guide	\$20.05	\$12.50
Programmers Helper	\$69.00	\$40.00
Basic Tutor	\$29.95	\$15.00
Typing Teacher	\$29.95	\$15.00
Sprite Designer	\$16.95	\$10.00
Medicinenen	\$19.95	\$12.00
Weather War II	\$19.95	\$12.00
Music-Maker	\$19.95	\$12.00
EDU-Pack	\$24.95	\$13.00
3D Maze Craze	\$24.95	\$13.00
Professional Joy Stick	\$24.95	\$12.00
Light Pen	\$39.95	\$20.00
Deluxe Dust Cover	\$ 8.95	\$ 4.60

(and many other items)

Write or call for

Sample SPECIAL SOFTWARE COUPON!

PROFESSIONAL BUSINESS SOFTWARE EXECUTIVE QUALITY BY TIME WORKS!

The Cadillac of business programs for Commodore 64 Computers

Item	List	*SALE
Inventory Management	\$89.00	\$69.00
Accounts Receivable	\$89.00	\$69.00
Accounts Payable	\$89.00	\$69.00
Payroll Management	\$89.00	\$69.00
Cash Flow Management	\$89.00	\$69.00
Sales Analysis	\$89.00	\$69.00
General Ledger	\$89.00	\$69.00

(*COUPON PRICE \$59.00)

VIC-20

(a real computer at the price of a toy)

\$77.00*

- 40-80 COLUMN BOARD \$89.00
- VOICE SYNTHESIZER \$59.00

(* with Cassette and Gortek purchase)

VIC-20 COMPUTER \$77.00

You get the Commodore VIC-20 Computer for only \$77.00 when you buy at sale prices: The Commodore Data Cassette for only \$69.00 and the Gortek Introduction to Basic program for only \$19.95. TOTAL LIST PRICE \$302.95. SPECIAL PACKAGE SALE PRICE \$165.25.

40-80 COLUMN BOARD \$89.00

A fantastic price breakthrough for VIC-20 owners on this most wanted accessory!! "Now you can get 40 or 80 Columns on your T.V. or Monitor Screen." Plus we add a word processor with mail merge, electronic spread sheet, time manager and terminal emulator!! These PLUS programs require 8K or 16K RAM memory. (Disk add \$10.00).

VOICE SYNTHESIZER \$59.00

Votrax Based. Make your VIC-20 COMPUTER TALK! Has features equivalent to other models costing over \$370.00. You can program an unlimited number of words and sentences and even adjust volume and pitch. You can make adventure games that talk! A must for enhancing your programming creativity and pleasure.

60K MEMORY EXPANDER \$59.00

Sixslot — Switch selectable — Reset button — Ribbon cable. A must to get the most out of your VIC-20 Computer. Includes FREE \$29.95 adventure game.

8K RAM CARTRIDGE \$39.95

Increases programming power 2 1/2 times. Expands total memory to 33K (33,000 bytes). Memory block switches are on outside of cover! Includes FREE \$16.95 game.

16K RAM CARTRIDGE \$69.00

Increases programming power 4 times. Expands total memory to 41K (41,000 bytes). Memory block switches are an outside cover! Includes FREE \$29.95 adventure game!!

12" GREEN SCREEN MONITOR \$99.00

Excellent quality GREEN PHOSPHOROUS VIDEO MONITOR with antiglare, 1920 characters (80 characters x 24 rows). Save your TV! a must for 80 column word processors. PLUS \$9.95 for VIC 20 or Commodore 64 Cable.

12" AMBER SCREEN MONITOR \$119.00

Premium quality AMBER VIDEO MONITOR with antiglare, (80 characters x 24 rows), exceptionally clear screen, faster scanning, 1000 lines. PLUS \$9.95 for VIC 20 or Commodore 64 Cable.

- LOWEST PRICES • 15 DAY FREE TRIAL • 90 DAY FREE REPLACEMENT WARRANTY
- BEST SERVICE IN U.S.A. • ONE DAY EXPRESS MAIL • OVER 500 PROGRAMS • FREE CATALOGS

Add \$10.00 for shipping, handling and insurance. Illinois residents please add 6% tax. Add \$20.00 for CANADA, PUERTO RICO, HAWAII orders. WE DO NOT EXPORT TO OTHER COUNTRIES.

Enclose Cashiers Check, Money Order or Personal Check. Allow 14 days for delivery, 2 to 7 days for phone orders, 1 day express mail!! Canada orders must be in U.S. dollars. VISA — MASTER CARD — C.O.D.

PROTECTO ENTERPRISES

(WE LOVE OUR CUSTOMERS)

BOX 550, BARRINGTON, ILLINOIS 60010
Phone 312/382-5244 to order

memory, it should still be quite fast.

The best technique I could develop that did all of the work using only one list simply searched for the smallest element and put it at the front, then looked for the second smallest and put that in the second place, and continued through to the end of the list.

I am currently using this program on a system with two floppy drives, 192K RAM and an Epson MX-100 printer. However, only one drive and 64K are required for operation. The program assumes that your files will all be on drive B, so you'll have to change the Open statements if you have only one drive or if you don't wish to allow it this assumption.

Program Procedure

Specifically, the program proceeds as follows: lines 10-50 prompt the user for the names of the input and output files and the length of each record, verifying that it's within the program's limit of 2550. As the Basic interpreter sets an upper limit of 255 bytes for any one field, I break up the input record into one to ten fields of 255 bytes each, except for the last one, which may be shorter in order to reach the exact record length given. (This yields a maximum record length of

2550, although this could be increased by adding fields to the Field statement.)

Line 70 dimensions some tables where descriptions of the sort key fields will be stored. KF contains the number of the 255-byte field in which the sort field occurs, KS contains the start position within that 255 bytes and KL contains the length.

Lines 80-150 then prompt the user for the start locations and lengths of each of his sort keys. (These start locations are given as the position within the entire record and then converted to the KF/KS form needed by the program in line 110.) If a sort key spans two of the 255-byte fields, I break it into two pieces by line 140.

The program next prepares to read the input file. Lines 210-230 set up the lengths of the fields for the input file. It will set these lengths to 255 bytes until it runs out of record. Then it will make one shorter field and set the rest to a length of zero.

Line 270 determines the maximum number of records that can be sorted, based on available memory of about 50,000 bytes (there's really somewhat more than that—you can bump this number in a pinch). It also determines the total of the lengths of the sort keys

that the user has specified (adding three for the overhead on the string field and two more for an integer record number for each record).

Now the program actually reads through the file and picks up the sort keys in lines 300-380. The key line is 350, which picks up each key with a MID\$ and concatenates it on to a running "total key."

We are finally ready to do the actual sort in lines 400-480. The program passes through the list looking for the smallest key value, which it points to with field MIN. After it has gone through the entire list and knows that it has the smallest value, the program swaps this entry with whatever was in the first position in the table. The process is repeated to find the second smallest, the third smallest and so on, until the entire list has been ordered.

We now have a list of record numbers in a table in the order in which the records should appear on the output file. Lines 600-700 now read through this sorted list to pick up the records in their proper order and write them into the output file. This is the most time-consuming portion of the program because it must "hop around" the disk to get the records in the order it wants.

At this point, we are no longer interested in the key fields, just the record numbers. Once this step is completed, the program closes the files and ends.

In practice, I have found that, given the shortness of this program, it is most readily used as a subroutine. It replaces the user prompts with a few assignment statements before doing the gosub and before exchanging the production of the output file for a routine that produces the final report or performs the computations desired.

This not only simplifies the program flow (eliminating the need for Bat files, or Chaining, or, worse yet, human intervention), but it also saves the overhead of writing an output file and then promptly reading it back in again.

In conclusion, my main point of dissatisfaction with this program is the inelegance of the "look-up" sort. Its execution time is not very long, particularly when compared with the time required to do the disk I/O, but this is due more to the speed of internal memory accesses than to efficiency of the sort.

I'm still searching for an algorithm that can sort more quickly without using any more memory. ■

Listing continued.

```
325 GET 1,RN:IF IREC$(1)=EOF1$ THEN 400
330 R(RN)=RN:K$(RN)=""
340 FOR KX=1 TO KZ
350 K$(RN)=K$(RN)+MID$(IREC$(KF(KX)),KS(KX),KL(KX))
360 NEXT
380 RN=RN+1:GOTO 320
400 REM sort keys
405 PRINT "...sorting keys"
410 RZ=RN-1
420 FOR RX=1 TO RZ
430 MIN=RX
440 FOR RX2=RX+1 TO RZ
450 IF K$(RX2)<K$(MIN) THEN MIN=RX2
460 NEXT RX2
470 HR=R(RX):R(RX)=R(MIN):R(MIN)=HR
480 HK$=K$(RX):K$(RX)=K$(MIN):K$(MIN)=HK$
500 NEXT
600 REM write sortout
605 PRINT "...writing output file"
610 OPEN "B:"+STOUT$ AS #2 LEN=LRECL
620 DIM OREC$(9)
630 FIELD 2,FL(0) AS OREC$(0),FL(1) AS OREC$(1),FL(2) AS OREC$(2),FL(3) AS OREC$(3),FL(4) AS OREC$(4),FL(5) AS OREC$(5),FL(6) AS OREC$(6),FL(7) AS OREC$(7),FL(8) AS OREC$(8),FL(9) AS OREC$(9)
640 FOR RX=1 TO RZ
650 GET 1,R(RX)
660 FOR FX=0 TO FZ
670 LSET OREC$(FX)=IREC$(FX)
680 NEXT
690 PUT 2,RX
700 NEXT
900 REM eof
910 CLOSE 1:CLOSE 2
920 PRINT "done"
930 END
```


Polyester liner cleans disc during use.

Stress-relief notches prevent disc damage during handling.

Ultra smooth surface helps reduce disc and head wear.

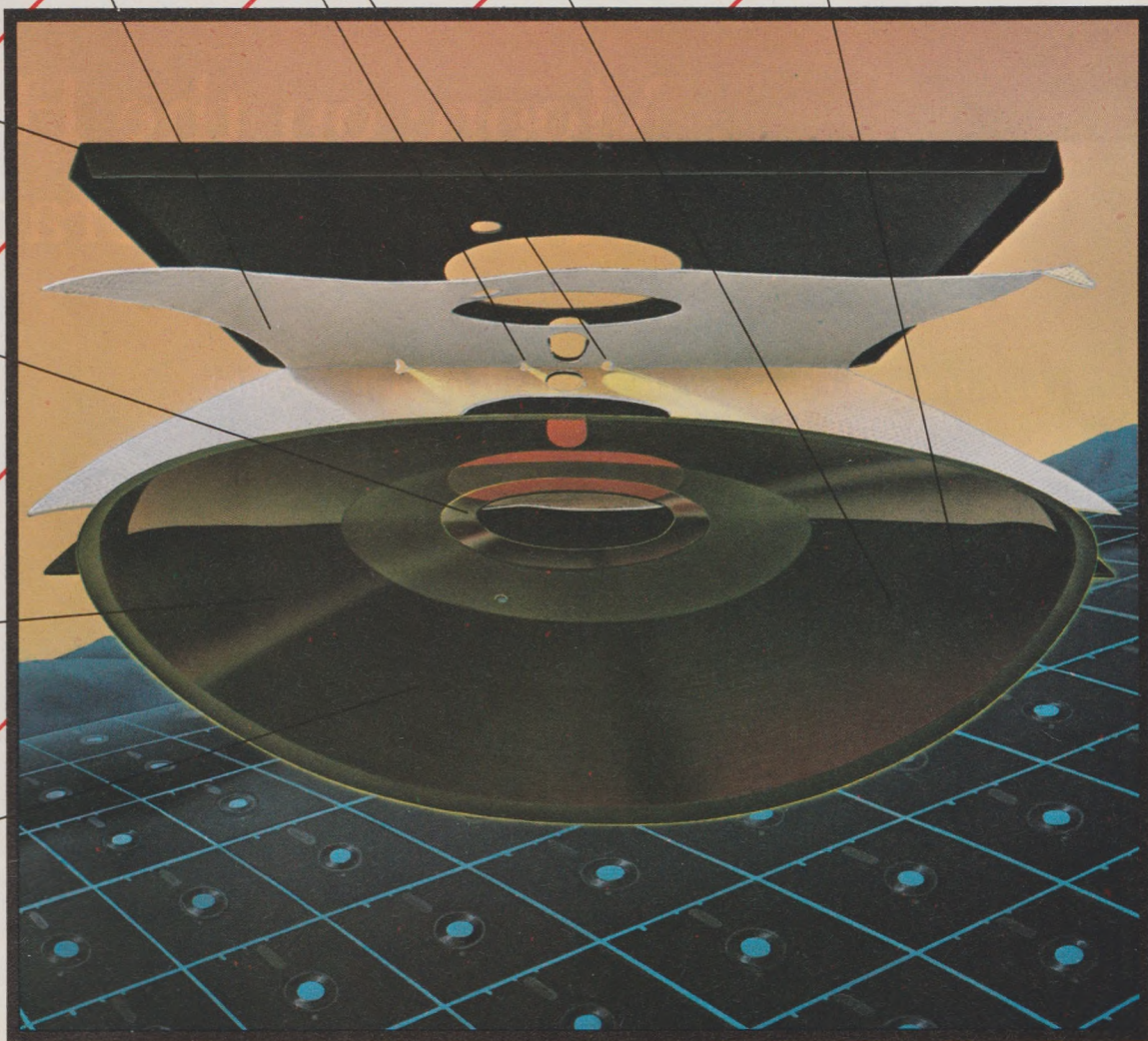
Every disc tested and certified 100% error-free.

Extra stiff glue-sealed jacket allows easy loading.

Protective hub ring prevents edge damage.

Durable coating optimizes signal output and recording accuracy.

Protective anti-static lubricant prolongs head & media life.



We opened this quality disc to show how it stands up and performs.

On the surface, flexible discs look alike. But if you inspect them closely, Memorex® sets itself apart.

The cross-linked oxide coating is unique. It results in a coating that will hold a stronger signal for greater recording and playback accuracy. Each disc is burnished to an ultra-smooth surface to reduce head wear and extend media life. A protective hub ring on mini discs eliminates edge damage to the drive access opening resulting in better alignment and dependable performance.

For durability, we constructed a disc jacket from extra-stiff vinyl that loads easier. Glue-sealed to prevent intermittent bonding and stress-notched for added protection, discs withstand the rigors of everyday usage better.

We added a self-cleaning jacket liner that cleans and removes debris from the disc while in use. The result is top performance throughout a long disc life.

You can trust Memorex flexible discs. You know they're reliable because we individually certify every one to be 100% error free.

For any application—5¼" or 8", one side or two, single or double density—look to Memorex Flexible discs. For more information, call (800) 222-1150; in California call collect (408) 987-1893 or your local distributor today.



MEMOREX

A Burroughs Company

© 1983 Memorex Corporation. Memorex is a registered trademark of Memorex Corporation.

Circle 382 on Reader Service card.

Moore on the H120: A New Generation

In part 2 of our review of Heath's latest kit-form computer, Martin Moore details the H120's features.

By Martin Moore

Last month we talked about assembling the Heathkit H120 personal computer. In this part, we'll discuss what you get when you buy an H120.

A New Generation Is Born

The H120 (and its companion—the low-profile model H110) are truly third-generation machines. By the way, the only difference between the H120 and the H110 is that the H120 has a built-in monitor, whereas you have to buy an external monitor for the H110. Functionally, they're the same.

The H120 has two microprocessors: an 8088 and an 8085. Heath's reasoning was that you could enjoy the benefits of a 16-bit microprocessor (the 8088) while retaining access to the huge software base for CP/M (which runs on the 8085, an eight-bit processor). Both processors run at 5 MHz.

The H120 comes standard with 128K of RAM. An additional 64K can be added to the main board, bringing the total to 192K without installing any more circuit boards.

If you go out and buy some S-100 (IEEE 696) memory boards, you can plug those in until you have a total of 786K—a lot of memory. In fact, that's



more memory than you can stuff in almost any other personal computer.

The H120 kit comes standard with one double-sided, double-density 5¼-inch flexible disk drive.

The drive will store 320K on a disk. You can add another on-board drive, as well as up to four external eight-inch double-sided, double-density drives. That would give you about five megabytes of mass storage.

Medium-density graphics are supported by the H120. The screen will display a matrix of 640×225 pixels. With added display memory, you can

assign each pixel one of eight colors. Or, with a monochrome monitor, each pixel can be assigned one of eight intensity levels.

The H120 also features a variety of interfaces. Two RS-232C ports are provided, as well as a Centronics standard parallel port. You also get an RGB (red-green-blue) port that will drive an appropriate color monitor. As a bonus, Heath has thrown in a light-pen port. You have to provide the handling software.

The keyboard is laid out like an IBM typewriter (not the IBM PC), and has 13 programmable keys.

The keyboard will autorepeat (a feature lacking in the H89), and has a

fast-repeat key. An interesting feature of the H120 keyboard is that it can be programmed to send two signals to the computer—one when the key is depressed and another when the key is released. This ability should allow for some creative games programming.

Finally, Heath has added a five-slot S-100 (recommended IEEE 696 standard) bus. One of the slots is taken up by the disk drive controller, but the remaining slots are available for any S-100 card, excluding another processor card.

What kind of software is available? All kinds. Heath sells your choice of operating systems: either Z DOS, which is a version of Microsoft's MS DOS (the same thing as IBM's DOS) or you can have CP/M. At this time, there's far more eight-bit software available for CP/M than there is 16-bit software for Z DOS. But the situation is changing rapidly.

So, what you have is a powerful, flexible, high-quality desktop computer.

Picking the H120's Brains

The brains of the H120 reside on a single-circuit board. The main board contains the 8088 and 8085 proces-

sors, RAM and ROM memory, I/O ports (including the lightpen port), and a five-slot S-100 bus.

Two Chips Are Better

The H120 uses two microprocessors for a good reason. The 8085 will run the vast quantity of CP/M software floating around. The 8088, because of its internal 16-bit architecture, is intrinsically a more powerful processor. As more software becomes available for the Z DOS (MS DOS) operating system, more and more use will be made of the 8088.

When you have two microprocessors sharing the same bus structure, you run into an interesting set of problems. For example, when the computer is powered up, who goes first? The 8085 or the 8088? And, how do you switch from one to the other? Heath uses a "processor swap port" to handle this problem.

At power-up or reset, both processors are reset, and then the 8085 is turned on to begin executing the boot code in ROM. Part way through the code, the 8085 turns itself off by setting a bit in the swap port, which turns on the 8088.

The 8088 then executes the rest of the boot ROM until it begins to load the operating system from disk. The 8088 then decides whether or not it can execute the code loaded from disk. If it can't, it turns itself off and turns on the 8085.

Data and Address Buses

The data bus within the H120 is eight data bits wide. The address bus is 24 bits wide, which is interesting when you consider the fact that the 8085 normally works with a 16-bit-wide address bus.

Even the 8088 is set up to generate 20-bit addresses. What Heath has done is extend the address range of both microprocessors with two four-bit data latches.

When the 8085 is running, the two four-bit latches are driven by the data bus. The outputs of the data latches are then fed to address lines A16 through A23. When the 8088 is running only one of the data latches is used, extending the 8088 address width by four bits.

For the Memory

There are three groups of memory

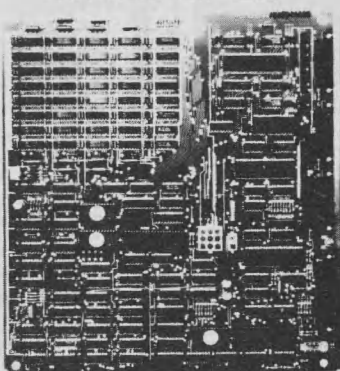
Circle 269 on Reader Service card.

Z80* SINGLE BOARD COMPUTER!

64K RAM — 80 x 24 VIDEO DISPLAY — FLOPPY DISK CONTROLLER
RUNS CP/M* 2.2!

BRAND NEW
PC BOARDS
WITH SCHEMATICS!

ALL ORDERS WILL BE
PROCESSED ON A STRICT,
FIRST COME, FIRST SERVED
BASIS! ORDER EARLY!



\$39.95

(BLANK BOARD WITH
DATA AND ROM'S.)

GROUP SPECIAL:
BUY 6 FOR \$205!

USES EASY
TO GET PARTS!

UNBELIEVABLE LOW PRICE!!! GIANT COMPUTER MANUFACTURER'S SURPLUS!

Recently Xerox Corp. changed designs on their popular 820* computer. These prime, new, 820-1 PC boards were declared as surplus and sold. Their loss is your gain! These boards are 4 layers for lower noise, are solder masked, and have a silk screened component legend. They are absolutely some of the best quality PC boards we have seen, and all have passed final vendor QC. Please note, however, these surplus boards were sold by Xerox to us on an AS IS basis and they will not warranty nor support this part.

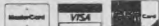
We provide complete schematics, ROM'S, and parts lists. If you are an EXPERIENCED computer hacker, this board is for you! Remember, these are prime, unused PC boards! But since we have no control over the quality of parts used to populate the blank board, we must sell these boards as is, without warranty. You will have to do any debugging, if necessary, yourself! CP/M 2.2 for the original Big Board, sold by Digital Research Computers, P. O. Box 461565, Garland, Texas 75046, will run on this PC board without modification. It is available from them for \$139 including manuals.

*CP/M TM OF DIGITAL RESEARCH INC. (CALIF.) 820 TM OF XEROX CORP. Z80 TM OF ZILOG

ADD \$2 PER PC BOARD FOR SHIPPING. (USA and Canada)

B. G. MICRO

P. O. Box 280298 Dallas, Texas 75228
(214) 271-5546



TERMS: Orders over \$50 add 85¢ insurance. No COD. Tex. Res. Add 5% Sales Tax. Subject to prior sale. Foreign orders: US funds only. We cannot ship to Mexico. Foreign countries other than Canada add \$6 per board shipping.

on the main board: ROM, RAM and parity RAM. Up to 192K of main-storage RAM can be installed on the main board, and for each byte of main-storage RAM there is another bit for parity checking located in parity RAM.

Each time a byte is written into main-storage RAM, parity circuitry issues a parity bit which is stored in

parity RAM. Then, when the byte is read back out of main storage RAM, the parity circuitry checks the byte parity against the parity bit stored. If the parity doesn't match (even or odd), a parity-error interrupt is sent to the processor. What all this means is that the H120 can continually check its own main-storage RAM for failures.

Additional ROM can be installed in the H120 (up to 768K) by plugging memory boards into the S-100 bus card cage.

The H120 supports two serial I/O ports as standard features. Both are RS-232C ports, one configured as a DCE port and the other configured as a DTE port. The DCE port is usually used to drive a printer, while the DTE port normally connects to a modem or another computer.

The H120 also contains a Centronics-compatible parallel I/O port. And, you can buy any number of I/O extension cards to plug into the S-100 bus. There are 11 empty connector holes in the H120 backpanel (see Photo 1).

An Unsupported Lightpen Port

A standard hardware feature is the lightpen port which, unfortunately, is not supported by the Heath operating system. However, Heath provides enough information for you to write your own supporting software.

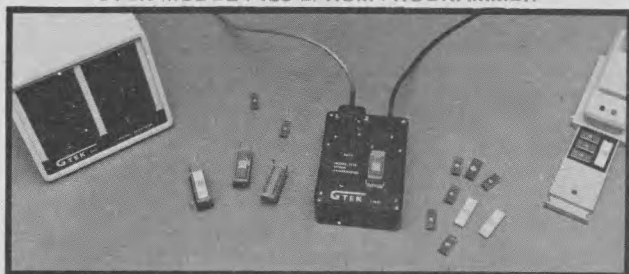
The lightpen port hardware works this way: When the CPU lights a dot on the CRT within the range of the lightpen, the lightpen issues a pulse.



Photo 1. The H120 rear panel. J1 and J2 are RS-232C connectors, while J3 is a Centronics-compatible parallel port. J4 is for lightpen input and J9 is the RGB monitor output.

Circle 261 on Reader Service card.

DEVELOPMENT HARDWARE/SOFTWARE GTEK MODEL 7128 EPROM PROGRAMMER



- Microprocessor based intelligence for ease of use and interface. You send the data, the 7128 takes care of the rest.
- RS-232 interface and ASCII data formats make the 7128 compatible with virtually any computer with an RS-232 serial interface port.
- Auto-select baud rate.
- Use with or without handshaking. Bidirectional Xon/Xoff supported. CTS/DTR supported.
- Devices supported as of DEC 82,

NMOS	NMOS	CMOS	EEPROM	MPU'S
2756	2508	27C16	5213	8748
2716	2516	27C32	5213H	8748H
2732	2532	08716	X2816	8749
2732A	2564	27C64	48016	8741
2764	68766		12816A	8742
27128	8755			8751
27256				
- Read pin compatible ROMS also.
- Automatic use of proper program voltage based on type selected.
- Menu driven eprom type selection, no personality modules required. (40 pin devices require adapter)
- INTEL, Motorola and MCS-86, Hex formats. Split facility for 16 bit data-paths. Read, program, and formatted list commands also.
- Interrupt driven type ahead, program and verify real time while sanding data.
- Program single byte, block, or whole eprom.
- Intelligent diagnostics discern between eprom which is bad and one which merely needs erasing.
- Verify erasure and compare commands.
- Busy light indicates when power is being applied to program socket.
- Complete with TEXTTOOL zero insertion force socket and integral 120 VAC power supply. (240 VAC/50HZ available also)
- High Performance/Cost ratio.

*** Model 7128 PRICE \$389.00 ***

MODEL 7128 SOCKET ADAPTERS
MODEL 481 allows programming of 8748, 8749, 8741, 8742 single chip processors. Price \$98.00

MODEL 511 allows programming the 8751, Intel's high powered single chip processor. Price \$174.00

MODEL 755 allows programming the 8755 EPROM/IO chip Price \$135.00

MODEL 7128/24 - budget version of the 7128. Supports 24 pin parts thru 32K only. Upgradable to full 7128 capacity. Price \$289.00

Non-expandable, very low cost models available for specific devices.
MODEL 7128-L1 for 2716 only \$179.00
MODEL 7128-L2 for 2732 only \$209.00

Also available from stock:
Eprom Erasers UVP model DE-4 . . . \$78.00
Avocet Systems Cross Assemblers \$200.00
RS-232 Cable Assemblies \$25.00
Programmable Devices call
Complete development systems . . \$3240.00

Post Office Box 289
Waveland, Mississippi 39576
(601) 467-8048

GTEK INC.

Circle 251 on Reader Service card.

CP/M® with 80 x 24 VIDEO DISPLAY for TRS-80® MODEL III HOLIDAY SPECIAL ONLY **\$325.00**

(Add \$100.00 for 64K extended memory)

FEATURES OF VID-80™, W/ CP/M®:

- CP/M OP System
- Read & write many disk formats - including IBM PC, Osborne I, KAYPRO II, ZENITH, XEROX, etc.
- 80 x 24 Display
- UCSD Pascal - p System (optional)
- Model IV Compatible - Run TRS DOS 6.1 (optional)
- Read-Write-Run many of the thousands of CP/M based business and personal software packages
- 112K Extended memory option - set up as solid state disk
- Optional 5MHZ System speed up - Sprinter III™

AND MUCH, MUCH MORE . . .
— ORDER FROM STOCK TODAY —

Call or write today for a free full product brochure on Model 100 Micro Drives, accessories, and Model I, III and IV peripheral products. CP/M is a registered trademark of Digital Research. TRS-80 is a registered trademark of Tandy Corp.



Call For Dealer Nearest
You

Dealer Inquiries Invited
One year warranty on all products.

Add shipping/handling \$5.00 U.S. and Canada. All others add 15%. Prices subject to change without notice.

**HOLMES
ENGINEERING, INC.**

5175 Green Pine Drive Salt Lake City, Utah 84107
(801) 261-5652 or 24 Hr. BBS (801) 268-1103

80 COLUMNS!
25 LINES!

A FULL PROFESSIONAL
DISPLAY FOR
Commodore 64
with

Screenmaker™

Screenmaker is a video display generator module that plugs into the expansion connector of the Commodore 64.

- ✓ WORD PROCESSING
- ✓ CALCULATIONS
- ✓ BASIC PROGRAMS

Screenmaker provides a B & W video signal that connects to your video monitor to provide a full 80 characters on each line. With Screenmaker, Screen displays will appear the same as the printer output. Trial printouts can be eliminated. Word processing is easier. Forms and reports can be set up faster. Screenmaker features a bank switched memory, 40/80 video switch, and a full character set including graphics.

SCREENMAKER \$179.95

Copy-Writer Word Processor... \$ 99.95

SCREENMAKER/

Copy-Writer Package..... \$239.95

MICROTECH

P.O. Box 102
Langhorne, Pa. 19047

215-757-0284

DYNAMITE DOWNLOADER

Visit
Our Booth
at Comdex/Fall 83

Discon System formats (initializes), reads, writes and converts among dozens of 8" and 5-1/4" (48 and 96 TPI) CP/M™ Disc Formats. The complete system, ready to use is only \$5555.00. Format Library updates are sent out at no additional cost.

From:

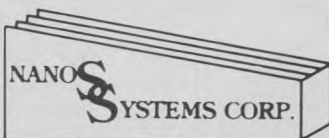
Pacifica Technology,
11696 Sorrento Valley Road
San Diego, CA 92121
619/453-2945

**CALL NOW FOR INSTANT ACCESS
TO SCORES OF DISC FORMATS**

*CP/M is a Registered Trademark of Digital Research



DISCON



SYSTEM REFERENCE CARDS

"This is a quality document and is beautifully conceived and produced.... I am in awe of your magnificent document."

H.W.W., Dayton, Ohio

Send Check or Money Order

CARD	ORDER NO.	PRICE
MODEL I: BASIC & Assembler	FC1002	\$4.95
MODEL I: BASIC Only	FC1001	2.95
MODEL II: BASIC & Assembler	FC1005	5.95
MODEL III: BASIC & Assembler	FC1003	5.95
MODEL III: BASIC Only	FC1004	3.95
COLOR: BASIC & Extended	FC1006	4.95
POCKET: BASIC	FC1009	2.95
APPLE II & II PLUS: BASIC & 6502	FC1008	4.95
APPLE II & II PLUS: BASIC Only	FC1007	3.95
HEATH/ZENITH	FC1014	5.95
Z80 MICROPROCESSOR	FC1011	4.95
ZX80, ZX81 and SINCLAIR 1000	FC1012	5.95

NEW!

**6502
MICROPROCESSOR**
FC1016 \$4.95

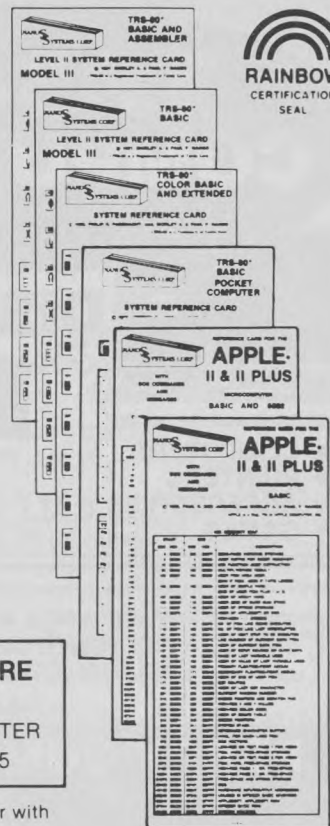
**VIC 20
MICROCOMPUTER**
FC1015 \$5.95

**COMMODORE
64
MICROCOMPUTER**
FC1017 \$5.95

Call TOLL-FREE for Credit Card Orders 1-800-258-5473. Or, send your order with payment or complete credit card information to:

WAYNE GREEN BOOKS • Retail Sales • Peterborough, NH 03458

Enclose \$1.00 per order for shipping and handling



*TRS-80 is a Registered Trademark of Tandy Corp.
APPLE is a Registered Trademark of APPLE COMPUTER, INC.
*Z80 is a Registered Trademark of Zilog, Inc.

The pulse is routed to the CRT controller device on the video-processor board.

The pulse tells the CRT controller to save the address of the current dot being displayed. At the same time, an interrupt is sent to the active microprocessor. At this point, it's up to you. Your software has to acknowledge the interrupt, and start an interrupt servicing routine to get the address of the dot from the CRT controller. Then you can do what you want with it.

The lightpen port uses a standard lightpen connector, so you shouldn't have any trouble hooking a pen up and using it for menu selection or even freehand drawing on the CRT.

The Display Picture

The H120 uses a medium-resolution display in either monochrome (standard) or color (optional). The display resolution is 640 horizontal pixels by 225 vertical pixels. The CRT is driven from a video logic board that rests on top of the main computer board.

The video logic board uses a bit-mapped display technique, which means that the active microprocessor

has control over each individual pixel. Standard terminals without bit-mapped displays rely on a character generator that creates a fixed set of characters.

With a bit-mapped display, the active microprocessor has direct access to the video RAM, and can create its

The H120 keyboard
is nice. It fits
the hands well...

own character set through software, and, as in the case of the H120, draw nice graphics.

An added benefit of the H120's bit-mapped display is that it can set each pixel to be one of eight shades of intensity, ranging from black to white. This feature requires that you buy more video RAM. Or, if you buy the color option, each pixel can be set to one of eight colors.

You can add video RAM by install-

ing either 32K memory devices or 64K memory devices. By installing the 64K devices, you get an extra page of display memory that lets you scroll backward in the display.

Should you buy the monochrome version of the H120 and want to add color capability later, you can. Simply add the color RAM and plug a high-quality color monitor into the H120's built-in RGB connector.

Waiting for the S-100 Bus

There's little to say about the S-100 bus used in the H120 except that it conforms to the proposed IEEE-696 bus standard. Five slots are built in to the H120, but the disk drive controller takes up one of them.

A Hand-Fitted Keyboard

The H120 keyboard is nice. It fits the hands well, and is laid out like an IBM typewriter keyboard (see Photo 2). There are 13 programmable keys, cursor control and editing keys, as well as all the normal ASCII keys. Heath has added one additional key that I like a lot. It's labeled HELP. Now, I'm not saying that Heath has

Circle 266 on Reader Service card

TRS-80 COMPUTERS

ALL PURE RADIO SHACK EQUIPMENT



DISCOUNT 15% AND UP

ALL TRS-80 MODELS

- COMPUTERS
- PRINTERS
- ACCESSORIES
- GAMES

CALL FOR OUR COMPETITIVE
PRICES ON OTHER MAJOR BRANDS

FREE PLEASE WRITE AND REQUEST...

- CUSTOMER DISCOUNT PRICE LIST
- MANUFACTURE WARRANTIES

© TRS-80 TANDY CORPORATION

PERRY COMPUTERS

Dept. No. E-5 137 NORTH MAIN ST., PERRY, MI 48872

FOR ORDERS CALL 1-800-248-3823

FOR INFORMATION CALL (517) 625-4161

Circle 123 on Reader Service card.

SUPER-FAST!

Z80

Relocating Macro ASSEMBLER

\$169.95

Directly generates COM, HEX, or REL files. Flexible REL format allows external bytes and words with complete math operations on them (Microsoft format optional). Features Zilog mnemonics with nested macros, conditionals and include files. Unique one-pass design generates compact intermediate code which is then processed to resolve forward references, yielding tremendous time savings. Complete listing, symbol table and cross-reference output may be sent to any device. The perfect tool for assembly language programming. Linker included. Manual only — \$30. For Z80 CP/M and TRS-80.

S L R Systems

1622 NORTH MAIN ST. • BUTLER, PA 16001 • (412) 282-0864

Shipping \$3 U.S., others \$7. PA + 6%. Check, MO, VISA, M/C, C.O.D.
Most formats available. Dealer and OEM inquiries invited.
Z80, CP/M, TRS-80 TM's of Zilog, Digital Research, Tandy Corp.

made use of the help key. They haven't. But they could if they wanted to; hopefully, anybody that writes a program to run on the H120 will use the help key. The help key simply sends a special code to the operating software. The software must provide the help routine.

The keyboard uses the now-standard repeat scheme. If you hold a key down for more than a second or two, the function of the key is automatically repeated. Heath has added an additional repeat key called "fast repeat" that just about doubles the normal repeat speed.

The keyboard can be put in an unusual mode with interesting possibilities. Heath calls it the event-driven (Up/Down) mode.

When the keyboard is in the event-driven mode, and a key is pressed down, the keyboard issues a nonstandard code with bit 7 cleared. Then, when the key is released, the same nonstandard code is sent, but this time bit 7 is set. This lets your software detect when a key is depressed as well as when it is released. There has to be some game software waiting to be developed that can make use of this feature.

The H120 Mounts Dual Drives

The disk-drive controller designed by Heath will handle both 5¼- and eight-inch soft-sectored, double-sided, double-density drives. You can mount two drives inside the H120 cabinet itself, and you can connect as many as four eight-inch drives outside the cabinet.

The drive controller is an S-100 compatible board. Heath even provides instructions for installing the board in S-100 computers other than its own.

Almost Any Software Will Do

You can run just about any software you want to on the H120. If you buy the CP/M operating system, you have access to a wealth of software from all kinds of sources.

If you buy the Z DOS operating system, what you're really buying is the Heath implementation of the same operating system offered by IBM for its personal computer.

Heath also offers a Basic compiler called ZBasic, which is nearly the same as IBM's BasicA language. I say nearly, because there are significant hardware differences between the IBM PC and the H120. These differences are most apparent in the Basic

commands that support the graphics.

Of course, common Basic language features are the same for both machines, but each language handles graphics in a different manner.

Terrific, Powerful, Flexible, But...

Without a doubt, the H120 is a terrific machine. It's powerful, flexible, expandable and has a lot of software available.

The only complaint I have with the machine is Heath's decision (again) to build the keyboard into the computer. Heath won't sell many computers in Germany, a country that has stiff requirements about the human factors aspect of electronic equipment.

There is an organization in Germany called the Trade Cooperative Association (TCA). The TCA has a strict set of ergonomic standards in place. It can ban the sale in Germany of any equipment that violates its standards. One of the TCA's standards is that the keyboard be detachable and thin. If this were true only Germany, Heath (and Apple) might not be in too much trouble. But, the TCA standards are being widely accepted throughout Europe as *the standard*.

Ergonomics aside, the H120 is a remarkable desktop computer; it's well-suited for today's ever-increasing demands for power and flexibility. Take a look at one the next time you're close to a Heathkit store. ■



Photo 2. The H120 keyboard is a sculpted, IBM typewriter-like keyboard with 13 function keys.

Circle 219 on Reader Service card.

Problems interfacing RS-232?

Now reverse pins 2 and 3 with
the flip of a switch!

Eliminates special cables!

At last, you can interface any two RS-232 devices easily by inserting the Reversing Switch in the RS-232 line between them. The Reversing Switch comes with two RS-232 connectors (one male-one female) and requires no power. \$29.01 with satisfaction guaranteed.

Jaxon
197 Hathaway Road PO Box 265
De Witt, NY 13214
(315) 446-2763

Circle 5 on Reader Service card.

LEARN COMPUTER PROGRAMMING THE EASY WAY —

This VIDEO TAPE Collection
Makes It Possible

Introduction to Basic	\$39.95 ea.
Intermediate Basic	\$39.95 ea.
Introduction to Pascal	\$39.95 ea.
Intermediate Pascal	\$39.95 ea.
Special - two or more	\$34.95 ea.

Specify VHS or BETA format
Add \$3.00 shipping per tape
5% tax in Florida
Mastercard or Visa accepted

800-428-7825 ext. 179 (orders only)
(Calif. 800-428-7824 ext. 179)
(904) 466-3038

KISKO
Rt. 1, Box 787A
Micanopy, FL 32667

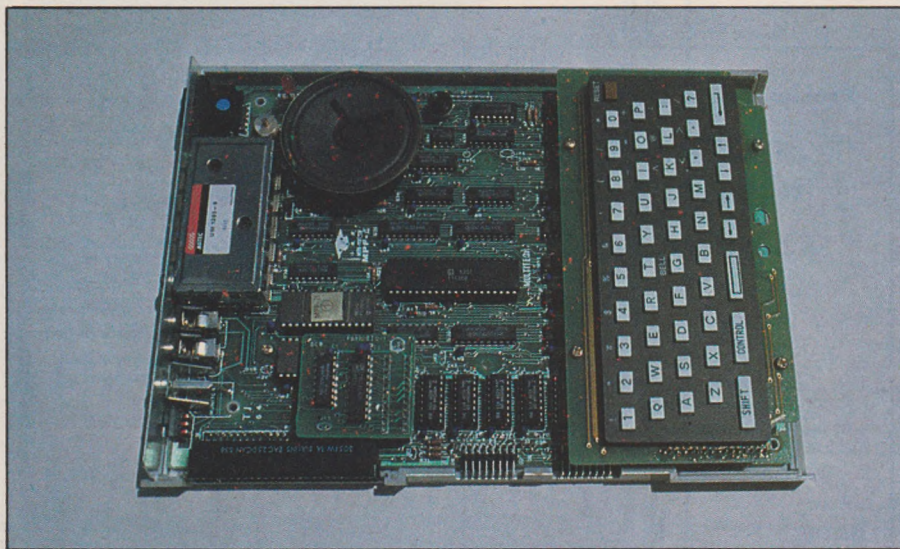
The MPF-II: An Apple Alternative?

*The star of the Chinese Invasion is the Micro-Professor.
Last month, we looked at the MPF-I; this month, author
Tim Daniel takes a peek at the tiny Apple-compatible MPF-II.*

By Tim Daniel



The MPF-II is about the same size as the Timex/Sinclair 1000. It is 6502-based, and bears many similarities to MPF-I.



The Micro-Professor II offers a full-size keyboard to make programming easier. The computer also supports a single Apple disk drive, a printer interface, a speech synthesizer, a Chinese character controller and a joystick.

The Multi-Tech Electronics Micro-Professor II is a hands-down winner for this year's award for the most unique computer. The system features a price tag of \$399, 64K RAM and limited compatibility with the Apple II computer.

The MPF-II's size will remind you of a Timex/Sinclair 1000; the small plastic keys are reminiscent of what you might find on a cheap calculator, and the numerous programming aids are akin to the Atari personal computers.

Amid this hybrid of silicon is a 6502-based hobbyist computer that bears many similarities to the MPF-I, its fellow Taiwanese import.

In its simplest configuration, the MPF-II includes a switching power supply, interconnecting cables and a switch to go on the back of your TV set. You need only add a cassette recorder for data storage and a TV set (the unit includes an rf modulator) or a composite video monitor. Fully loaded, the MPF-II can support a single standard Apple disk drive, a printer interface, a speech synthesizer, a Chinese character controller and a joystick.

For programming ease, Multi-Tech also offers a full-sized keyboard—one that uses the rubber *chiclet*-style keys.

The MPF-II's 16K system ROM includes a Basic interpreter that's remarkably similar to Applesoft Basic. The MPF version supports 40-column uppercase text, high- and low-resolution color graphics, string functions and arrays... just like the Apple.

Unlike the Apple, programming on the MPF-II is speeded up by the ability

Address correspondence to Timothy Daniel, Peabody Drive, Oxford, OH 45056.

In the flash of one second, Delta-10 can print the alphabet six times.

At 160 cps, 100% duty cycle, Delta-10 is built for speed. It's the dot matrix printer that quickly strikes up an intense working relationship with your computer.

There's no nonsense. Delta-10 performs with serial and parallel interfaces as standard. The 8K buffer gives Delta-10 the power to instantaneously store and print data as it frees your computer to continue its job. Turn Delta on

and it can print three crisp copies simultaneously at the continuous speed of 160 cps.

And Delta-10's performance isn't only measured in swiftness. There's the diversity of its character fonts, its true descender matrix, and its underlining ability.

Star's new Delta-10. Designed for red-hot efficiency. And isn't that what you need?

star
MICRONICS • INC

THE POWER BEHIND THE PRINTED WORD.

Computer Peripherals Division
P.O. Box 612186, Dallas/Ft. Worth Airport, TX 75261



LIMITED
TIME OFFER

GET THE SINGLE MOST IMPORTANT PERIPHERAL FOR YOUR IBM PC AND COMPATIBLES AND SAVE 47%!

PC WORLD

PC WORLD IS MUCH MORE THAN A MAGAZINE.

PC World is the single most important peripheral for your IBM Personal Computer and Compatibles.

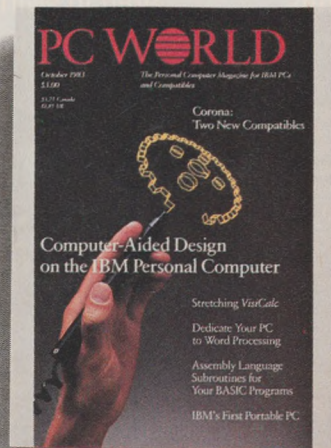
The world of the personal computer is constantly expanding. Every day hardware and software makers are developing new products to expand the capabilities of your PC. To get the most out of your personal computer, you need PC World. Each issue is packed with authoritative, independent reviews of these new products—all written with a minimum of technical jargon.

If you're not reading PC World, you're not getting the most out of your personal computer.



SUBSCRIBE BEFORE DECEMBER 31, 1983, AND SAVE 47% ON PC WORLD.

Even at its regular newsstand price of \$3 per copy, PC World is a bargain. But if you subscribe before December 31, 1983, you'll receive 14 issues—including our special **HARDWARE** and **SOFTWARE REVIEWS**—for only \$24.00. You'll save 47% off the regular newsstand price.



YOU ALSO GET PC WORLD'S NO-RISK GUARANTEE:

We're absolutely certain that once you've come to rely on PC World you won't want to miss a single copy. That's why we can make you this no-risk guarantee.

If, within the first 90 days of beginning your subscription to PC World, you are not completely satisfied, just write us of your intention to cancel and we'll REFUND 100% of your subscription price.

With new advancements every day, you need PC World every month.

to use single keystrokes to enter frequently used Basic tokens like Goto, Next and REM.

Another nice feature is the computer's set of block graphics characters. These are handy for drawing borders and creating simple patterns, especially since they can be combined with a text display.

Software Compatibility Limited

Software compatibility with the Apple is severely limited because of differences in the MPF-II's memory mapping. In general, any program shorter than 21K in length, written in Applesoft Basic and containing no special absolute addresses will work on either computer. Unfortunately, this rules out most commercial software, including all the games, word processors and spreadsheet programs I tried. Of course, you can convert, provided you're familiar with both machines and are very patient.

A quick look inside the MPF-II will dispel any ideas that you might have about it being hardware compatible

The MPF-II offers an interesting low-cost alternative to the Apple.

with the Apple. It does, however, work with a standard 16-sector Apple disk drive. I found the MPF disk operating system to be slightly different than Apple DOS, requiring you to run special conversion software before using popular Apple utilities like COPYA and FID.

Documentation is similar to what you would find with the MPF-I. Although well-intended, it's not always clear or grammatically correct. Besides a step-by-step Basic tutorial, the draft I saw also included a fairly detailed technical description.

Serious business and home computerists will probably find the MPF-II's lack of software compatibility annoying, the keyboard less than adequate for long typing stints and the computer's overall design a bit flimsy. For these folks, the MPF-II will be a distant second to the Apple. But at a third of the price of an Apple IIe, the MPF-II offers an interesting low-cost alternative to folks who want to just get their feet wet with Basic, yet have the ability to upgrade one step at a time. ■

Mail the coupon below today OR call TOLL-FREE: 800-247-5420 (From Iowa: 800-532-1272).

PC WORLD		<input type="checkbox"/> I ACCEPT!	M0342
Please enroll me as a PC WORLD subscriber for 14 issues at \$24.			
<input type="checkbox"/> Bill Me	<input type="checkbox"/> Payment Enclosed	<input type="checkbox"/> Charge to my <input type="checkbox"/> VISA <input type="checkbox"/> MasterCard	
Account # _____		Interbank # _____	
Expiration Date _____		Signature _____	
All subscriptions begin with the next available issue. Please allow 6-8 weeks for delivery of your first issue. Outside the U.S., subscriptions must be prepaid in U.S. funds. For foreign surface mail add \$24 per year to the subscription rates; for foreign airmail add \$101 per year to the subscription rates. Allow an additional 4 weeks for delivery by foreign surface mail.			
NAME _____		COMPANY _____	
ADDRESS _____			
CITY, STATE, ZIP _____			
Mail to: PC WORLD, Subscription Dept., P.O. Box 6700, Bergenfield, NJ 07621.			

EXPAND YOUR
WORLD!



**MAKE IT
EASY
TO
SAVE
your copies of**



MICROCOMPUTING

Your magazine library is your prime reference source—keep it handy and keep it neat with these strong library shelf boxes. They are made of white corrugated cardboard and are dust resistant. Use them to keep *all* your magazines orderly yet available for constant reference.

Self-sticking labels are available for the following:

80 Micro	73 Magazine	Radio Electronics
Microcomputing	QST	Personal Computing
inCider	CQ	HOT CoCo
Desktop Computing	Ham Radio	Interface Age

One box (BX1000) is \$2.00, 2-7 boxes (BX1001) are \$1.50 each, and 8 or more boxes (BX1002) are \$1.25 each. Be sure to specify which labels we should send.

Call **TOLL-FREE** for credit card orders:

1-800-258-5473

Or use the order form in this magazine and mail to:

MICROCOMPUTING

Attn: Book Sales, Peterborough, NH 03458

☐ SHIPPING AND HANDLING CHARGES \$2.00 per order up to and including a quantity of eight 25¢ for each additional box ordered. ☐

MOVING?

Let us know 8 weeks in advance so that you won't miss a single issue of Microcomputing

Extend my subscription one additional year for only \$24.97

☐ Payment enclosed ☐ Bill Me

Canada & Mexico \$27.97 1 year only drawn on US bank. Foreign Surface \$44.97 1 year only, U.S. Funds drawn on US banks only.

Attach old label where indicated and print new address in space provided. Also include your mailing label whenever you write concerning your subscription. It helps us serve you promptly.

AFFIX LABEL

If you have no label handy, print OLD address here:

Name _____

Address _____

City _____ State _____ Zip _____

Print NEW address here:

Name _____

Address _____

City _____ State _____ Zip _____

MICROCOMPUTING

P.O. Box 997 • FARMINGDALE, N.Y. 11737

T/S 1000 Books That Work For You



Special offer! Get both books for just \$19.97.

Using the Timex/Sinclair 1000
by Ralph Coletti

The book to read after the manual. Put your computer to practical use with home, business, educational, and scientific applications (program listings included). A review of Sinclair BASIC contains hints for translating from other BASICs. Common mechanical problems and solutions and hardware modifications are also covered. Spiral-bound for easy computer-side use. Only \$9.97.

Converting to Timex/Sinclair BASIC
by S. L. Bird

Translate other BASIC programs to run on your T/S 1000. This complete guide covers more than 200 BASIC instructions, including a description of how each T/S replacement works and an example of it in use. Just \$14.95 puts an almost endless supply of software at your fingertips. Spiral-bound.

Call **TOLL-FREE 1-800-258-5473** for your credit card orders or send payment with shipping and handling charges to **Wayne Green Books**, ATTN: Book Sales, Peterborough, NH 03458. Dealer inquiries invited.

YES, I want T/S 1000 books that work.

☐ Special offer. **Using the T/S 1000 AND Converting to T/S BASIC** (BK739601) for \$19.97 (\$2.00 shipping & handling).

☐ **Using the T/S 1000** (BK7397) \$9.97. ☐ **Converting to T/S BASIC** (BK7395) \$14.95. (\$1.50 shipping & handling for each)

☐ Payment enclosed ☐ MasterCard ☐ VISA ☐ Amex

Card# _____ MC Bank# _____ Exp. Date _____

Name _____ Signature _____

Address _____

City _____ State _____ Zip _____

Wayne Green Books • Peterborough, NH 03458

33NR7T

The T/S 1000: Make it on a Monitor

*No need to miss your favorite TV programs
while you're programming. . . . Now you can do both.
With this easy hardware modification, you can
make your T/S 1000 monitor-compatible.*

By Sharon Zardetto Aker

Using the T/S 1000 with a television set is not optional, it's mandatory; however, a simple hardware modification can make it compatible with a monitor.

The Monitor Advantage

Computer hobbyists who must use their television sets as monitors are at a practical disadvantage; in my own case, the only daytime hour I can devote to computing is during Sesame Street. Needing a computer-only display meant investing in either a second television or a monitor.

Although the T/S 1000 is strictly black and white, a newly purchased Commodore-64 and anticipation of the color T/S 2000 meant color was a must. The extra cost of a monitor (as opposed to a television) was a small

price to pay for sharper definition.

A computer that connects to a television has a modulator that converts the computer's video signal into a broadcast signal; the television changes the broadcast signal back into a video signal for display. This double translation often results in a poorer-quality final video signal. Also, if the rf modulator is less than top-notch, the problem is compounded. The net result is a slightly "smeared" display that is especially detrimental to the T/S 1000's inverse characters and graphics symbols.

Converting the Tiny Timex

The rf modulator in the T/S 1000 can be disconnected and the video output sent directly to the televi-

sion/monitor jack. However, I opted for tapping into the video signal just before it enters the modulator, leaving the latter intact in case I needed to use a television again. (After all, if I'm not vying for television time with my sons and Sesame Street, I might well be vying for monitor time with my husband and the Commodore.)

There are only a few items necessary for the project: a small Phillips screwdriver, soldering iron, solder, wire cutters, needle-nose pliers, plastic-coated electrical wire (solid core or strand) and electrical tape.

If you've never soldered before, practice on a few pieces of wire, keeping in mind that the point is not to drop a gob of melted solder on to the pieces you want joined, but to heat the wire, and let the solder flow onto it. Hold the wire with the needle-nose pliers, as a considerable amount of heat is conducted along it. It takes very little solder to make a solid connection.

The Step-By-Steps

1) Open the case. Lay the computer upside down and loosen the two exposed screws, as well as those hidden beneath three of the rubber feet, which peel off easily. Lift off the bot-

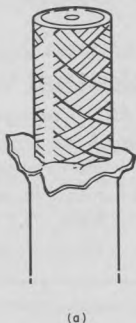


Fig. 1a. Preparing the cable.



Fig. 1b. Peeling back the outer covering.

tom of the case, leaving the loosened screws in the holes.

2) Prepare the cable (refer to Fig. 1a and 1b). Cut the plug off one end of the computer-to-television cable; peel back and trim about an inch of the outer covering. Careful slicing of the covering with a razor might facilitate this procedure. The braided copper wire just under the covering is the ground wire. Unwrap and pull it to the side, twisting it into one bundle.

The white core encases a wire that needs to be exposed. Use wire cutters or a razor to remove some of it, so that 1/4 inch of the central wire is exposed.

3) Add wires for flexibility: Although the two cable wires can be connected directly to the board, the connecting and subsequent closing of the case is much easier if you work with the more flexible coated wire.

Cut two 1 1/2 inch pieces, leaving bare about 1/4 inch of wire at each end; solder one piece to each of the wires of your video cable. Wrap the exposed soldered wires in electrical tape, making sure you keep track of which is the main wire and which is the ground.

Tuck the cable into the computer

case, snaking it out next to the video jack.

4) Connect the wires to the computer (refer to Fig. 2). There are six dots arranged on the board along the edge of the rf modulator. Three have wires already soldered to them from the underside of the board; the remaining three may be dots of solder or small open holes.

Solder the wire that comes from the

center of the cable to the dot that is third from the edge of the board, taking care that solder doesn't flow towards any of the other dots. Then solder the ground wire to the small post that is above the row of dots.

Voilà!

That's it, except, of course, for closing the case. *Voilà!* A monitor-compatible Timex/Sinclair! ■

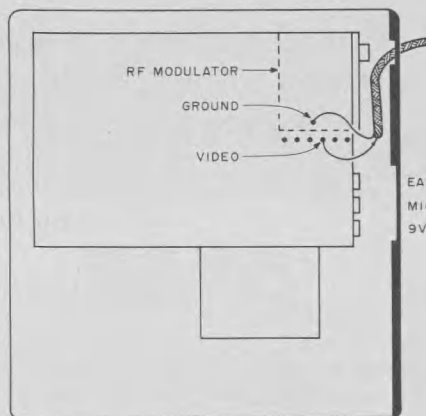


Fig. 2. Connecting the wires to the computer.

Circle 14 on Reader Service card.

QUALITY COMPONENTS - NOT MAIL ORDER "SECONDS"

Send SASE for FREE Flyer or send \$1.00 postage and handling for FREE COMPLETE CATALOG which includes coupon for \$1.00 OFF purchase.

ARIES ZERO INSERTION FORCE SOCKETS -

cam actuated, true zero insertion - tin plated solder tail pins - capable of being plugged into dip sockets, including wire wrap.

Stock No.	No. Pins	1-9	10-49	50
11055	24	4.98	\$4.35	\$3.90
11056	28	5.15	4.50	4.05
11057	40	6.81	5.95	5.35
11058	64	12.02	10.50	9.45

IC-KOOLERS from UNITRACK[®] dissipate over 2 watts of heat from IC's, producing longer life and better performance. Just push IC-Kooler on - heat is carried from top and bottom of IC and dissipated. Won't shake loose!



WILD ROVER

Touch switch capsule. Operating motion is .005" without the use of a levered arm. Extremely fast on and off with low noise. Normally open - rated 115 VAC, 1.6 amp-30 milliohm resistance - 615 radius by .160 thick.

Stock No.	1-9	10 & Up
12098	\$1.42	\$1.28

MIC 6000Z

Single rotary switch operation. Large, easy to read 5 3/4" digit display. 800 hours operating life with single 9v battery. Seven functions - IDC Volts, DC Amps, Ohms, AC Volts, AC Amps, Diode and Resistor Junction. Audible Continuity Check!

Stock No. 62503 Full 1 year warranty **\$75.00**

Stock No. 62504 Carrying case with belt loop **\$10.00**

60/40 ROSIN CORE SOLDER

Stock No.	Dia. (inches)	Length (feet)	Weight (oz.)	Price
50075	.062	9	1.5	\$1.16
50076	.062	25	4	2.39
50077	.062	50	8	4.25
50078	.032	33	1.5	1.31
50079	.032	88	4	2.47
50080	.032	175	8	4.57

TI WIRE WRAP SOCKETS

Tin plated phosphor bronze contact - 3 wrap

Stock No.	No. Pins	1-99	499	500
11301	8	\$4.0	\$3.6	\$3.0
11302	14	.59	.54	.45
11303	16	.64	.58	.48
11304	18	.73	.66	.55
11305	20	.99	.90	.75
11306	22	1.12	1.02	.85
11307	24	1.25	1.14	.95
11308	28	1.52	1.38	1.15
11309	40	2.05	1.86	1.55

TI LOW PROFILE SOCKETS

Tin plated copper alloy 688 contact pins with gas tight seal.

Stock No.	No. Pins	1-24	25-99	999
11201	8	\$1.0	\$0.9	\$0.8
11202	14	.14	.13	.12
11203	16	.16	.15	.14
11204	18	.18	.17	.15
11205	20	.20	.18	.16
11206	22	.22	.20	.18
11207	24	.24	.22	.20
11208	28	.28	.26	.25
11209	40	.40	.37	.33

EKI KITS come

with all parts necessary to assemble!

• Stock No. 88844 TV Jammer Kit "wipes out" your TV

screen **\$ 7.71**

• Stock No. 88850 Whooper Alarm Kit makes a great alarm or siren **\$11.33**

MANY, MANY MORE KITS AVAILABLE IN FULL LINE CATALOG

ELPAC POWER SUPPLIES - DC/DC CONVERTERS

SINTEC Stock No.	ELPAC No.	Input Voltage (VDC)	Output Voltage (VDC)	Output Current (mA)	Dimensions (HxWxD) in inches	Price
13825	CB3801	3.0-7.0	12±0.6	0-25	48x.51x3.05	\$ 7.95
13826	CB3811	3.0-7.0	12±0.6	0-25	48x.51x3.05	7.95
13827	CB3802	3.0-7.0	15±0.7	0-20	48x.51x3.05	7.95
13828	CB3812	3.0-7.0	15±0.7	0-20	48x.51x3.05	7.95
13829	CB3804	3.0-7.0	28±1.4	0-10	48x.51x3.05	7.95
13830	CB3814	3.0-7.0	28±1.4	0-10	48x.51x3.05	7.95
13831	CL3801	4.0-7.0	12±0.6	125	651x1.2x1.77	\$24.95
13832	CL3811	4.0-7.0	12±0.6	125	651x1.2x1.77	24.95
13833	CL3802	4.0-7.0	15±0.7	100	651x1.2x1.77	24.95
13834	CL3812	4.0-7.0	15±0.7	100	651x1.2x1.77	24.95
13835	CL3804	4.0-7.0	28±1.4	50	651x1.2x1.77	24.95
13836	CL3814	4.0-7.0	28±1.4	50	651x1.2x1.77	24.95
13825-1	DATA SHEET FOR DC/DC CONVERTERS..... 25					

Special of the Month!

CONTACT ELECTRONICS D-SUBMINIATURE CONNECTORS (RS232)

Stock No.	Description	Price
11354	25 Male solder cup	\$1.65
11355	25 Female solder cup	2.45

OPCOA

Single Digit Displays - Common Cathode

Stock No.	Color	1	100
12082	Red	\$1.12	\$.99
12085	Green	1.84	1.63
12087	Yellow	1.92	1.70
12089	Orange	2.08	1.84

Right Angle Socket for Above Displays

Stock No.	1	100
11010	\$1.24	\$.99

The Battery Just Wrap[®] Tool

New battery powered tool wraps insulated wire around .025" square posts without need for pre-cutting and pre-stripping. Complete with bit and 100 ft. 30 AWG wire.

Stock No.	Description	Price
13340	Battery just-wrap tool with bit	\$49.95
13341	Replacement bit	9.95
13342	100 ft blue replacement wire	6.95
13343	100 ft white replacement wire	6.95
13344	100 ft yellow replacement wire	6.95
13345	100 ft red replacement wire	6.95

MINI-DRILL

This portable hand drill is appropriate for circuit board drilling. Runs at 2500 RPM on 4 "AA" batteries (not included). Supplied with one .039 dia. bit. Drill stand is designed like a drill press for precise hole drilling.

Stock No.	Description	Price
13346	Hand drill with .039 dia. bit (no batteries)	\$24.95
13347	Replacement bits: 2 each of .040 and .060 dia.	5.95
13348	Drill stand	3.95

PIN FORMING TOOL

Trues IC's on their true row to row spacing. One side for 300 centers. Flip tool over for devices on 600 centers. Put device in tool and squeeze.

NEW! ANTI-STATIC MODEL Stock No. 10200 \$14.95

ONE TOOL DOES 8 thru 40 PINS! Stock No. 11059 \$12.95

OK MACHINE AND TOOL

IC INSERTION/EXTRACTION KIT Includes DIP IC extractors and inserters to accommodate all IC's from 14 to 40 pins. Tools that employ conductive fine wire and CMOS safe and include ground clips. Stock No. **\$37.74** 13309

SOCKET WRAP-IT DIP socket-sized plastic panels with numbered holes in pin locations. Signposts with reference wire wrapping to identify pins. Also, write on them for location IC part number, function, etc. Simultaneous initial wire wrapping, troubleshooting and repair.

Stock No.	Description	Price
13295	14 pin	\$1.29
13296	16 pin	1.29
13297	18 pin	1.29
13298	20 pin	1.29
13299	22 pin	1.29
13300	24 pin	1.29
13301	26 pin	1.29
13302	28 pin	1.29
13303	30 pin	1.29
13304	32 pin	1.29
13305	34 pin	1.29
13306	36 pin	1.29
13307	38 pin	1.29
13308	40 pin	1.29

\$1.82 per pack

IC EXTRACTOR

One-piece, spring steel construction. Will extract all LSI, MSI and SSL devices with 8 to 24 pins.

Stock No.	Price
13313	\$2.10

SINTEC

28, 8th Ave. Box 410
co. Frenchtown, NJ 08825



TOLL 800-526-5960
FREE in NJ (201) 996-4093

We accept VISA, MC, C.O.D., CHECK, or M.O.
*INCLUDE SHIPPING CHARGES
0 to \$100 - \$3.00
\$100 to \$250 - \$4.00
over \$250 - \$5.00

Kaypro's Mega-Memory Machine

With ten megabytes of hard disk memory in its new model, the Kaypro 10, and with the collapse of Osborne Computer Corp., Kaypro is taking command of the portable field.

By Bob Hickey

Wow, was I impressed when I saw the Kaypro 10 actually operating in my dealer's show room! Ten megabytes! It's not hard to be impressed by a transportable that can keep ten million characters of text and figures safely in storage.

When you open the Kaypro 10's shipping container, you'll notice the tightness of the packing fit. The machine is uniquely insulated from rough handling.

One dealer reports that there seems to be an improvement in Non-Linear Systems' quality control. The dealer cited the Kaypro Production Traveler tag as proof. The production traveler tag includes these items:

- Computer Assembly
- Power Supply
- Main Board
- Drive A
- Drive B
- CRT
- Keyboard
- Assembler's Signature
- Dot Test
- Video Check
- Burn In
- Coil Cord Check

Absent, however, was information on a check of floppy drive C. Like other things about these early Kaypro 10s, not everything has been converted from the Kaypro II.

When you take the cover off the Kaypro 10 (Photo 1), you'll discover further evidence of NLS's devotion to quality workmanship.

The most obvious expression of the

quality that NLS puts into its machine is the ground plane board placed across the bottom of the motherboard. It is designed to prevent interference among the internal circuitry.

The ground plane board is used to assure a clearer signal in some parts of the computing process, such as when you're running a modem program like Crosstalk. It prevents problems in reading and writing to the drives.

It was also good to note that NLS had double-shock-mounted the suspension system holding the hard disk. Good show, NLS!

Key Notes And Terminal Matters

The Kaypro 10's keyboard has 58 keys, plus a 14-key numeric keypad and four cursor keys. The caps key has a small red light, which, unlike the Kaypro II's, is weak; this makes it hard to determine its status under fluorescent light.

The terminal on the Kaypro 10 emulates the Leir/Seigler ADM-3A. A carrying handle is provided on the rear of the unit, and the keyboard attaches to the machine with a pair of plastic latches. When I bought my Kaypro II, I was skeptical of the way this type of latch would withstand constant operation. But after a year of daily use, I've experienced no problems with them.

Another feature is the pull-down bar NLS placed on the bottom of the machine. This bar allows the unit to be tilted when in use.

The Kaypro 10 has two RS-232C se-

rial communications ports, one designated for a serial printer and the other for a modem I/O port. It also features a Centronics-type parallel printer port (which I used straight-on without any problems with my Epson MX-80 printer), interface female jacks for the keyboard and a lightpen jack plugged with a plastic male jack.

NLS placed the reset button, the brightness control knob and the rocker power switch at the rear of the machine.

Trouble Ahead?

The power cord presents a minor problem. It needs extra length to allow

A Capsule Look At the Kaypro 10

Manufacturer

Non-Linear Systems, Inc., 533 Stevens Ave., Solana Beach, CA 92075.

Price

\$2795.

Standard Features

Z-80 CPU; 4 MHz clock speed; CP/M operating system; 4K ROM and 64K RAM; nine-inch green phosphor screen; 80 x 24 video display with 25th status line; hard disk and slim-line floppy drives by Tandon.

Documentation

Ninety-two-page user's guide.

Address correspondence to Bob Hickey, PO Box 770222, Eagle River, AK 99577-0222.



its male end to be inserted into one of the corner receptacles, away from the area where the female plug is inserted into the machine. Otherwise, transporting the machine will cause extra wear and tear on the plugs.

NLS recommends that the female plug be detached from the machine until the cord is wound around the posts and the male plug plugged into its post. Then the other end can be reinserted into the machine.

Another discrepancy involves the explanatory texts on the computer's hard disk; some of them retained references to the Kaypro II.

Bundle of Software

The machine I evaluated came equipped with:

- Perfect Writer
- Perfect Speller



The Kaypro 10 offers many features found in its older brother, the Kaypro II, but the big news is its ten megabytes of memory.

- The Word Plus
- Perfect Calc
- Perfect Filer
- ProfitPlan
- MBasic
- OBasic
- SBasic
- Games

One out of the 12 games, Aliens, was redesigned to operate on the Kaypro 10. Aliens is a pleasure to play compared with the same game on the Kaypro II. The rest of the games are the same as those provided with the Kaypro II, plus a couple of extra ones.

Meet the Manual

The documentation consists of a 92-page user's manual (95 pages, if you include the three-page index). Each page is single-sided, professionally written in clear language and accompanied by cartoonish illustrations, which do a

good job of making sense of things. Documentation includes a table of contents as well as an index.

For detailed explanations of the various Perfect software packages and the other software supplied with the unit, you are referred to the Perfect documentation for more specific information than the introductions in the user's manual.

With respect to the software provided, Chang Laboratories' ProfitPlan appears to have gotten a facelift. It uses some of the Kaypro 10's graphics capabilities and is listed on the screen as version 1.02. The cursor is lighted

in inverse video for the width of the characters in the column. Also in inverse video is a prompt line at the top of the spreadsheet.

Perfect Filer implemented the Kaypro 10 underlining feature, which is one of its strengths. In addition, Perfect Filer used the Kaypro 10's reduced intensity option for its database prompts while leaving user-entered items in full intensity. Too bad it's not used in the text mode of the word processors for screen display.

Perfect Calc didn't have any of the graphics features running on it—not even the status line provided as a 25th line on the Kaypro 10. This status line is mentioned on p. 14 of the Kaypro 10 manual, but it's not documented any further (other than in the NLS advertising brochures). I found out how to implement it when I called and talked with a spokesperson at Kaypro. The status line can be used in programs by sending the sequences in Table 1.

Perfect Writer is now integrated with The Word Plus and the display of the disk files through the [[Kaypro Word Processing Master Menu]], which runs under CP/M's Xsub submit facility. It's not as smooth or professional an operation as found in most integrated programs.

For example, the Perfect Speller integration with Perfect Writer shows you how an integrated package can work. Perfect Writer is not a Kaypro 10 program enhanced. It does not employ inverse video, 25th line status use, underlining or reduced video.

When using some of the software provided by Non-Linear Systems, you're left with a cluttered screen when done with the utility. For example, the public-domain derived D.COM, which is provided as a utility to place your directory area on the screen, doesn't have a provision for clearing the screen before putting up the directory display.

NLS advises that as of August 1, the Kaypro 10 was being shipped with the following software:

- WordStar
- The Word Plus
- CBasic
- MicroPlan
- MBasic
- SBasic
- SuperTerm

WordStar is being shipped without the implementation of the inverse video option. However, you can have your dealer implement this option using the WordStar install program.

It's really an impressive-looking display on the Kaypro 10.

The Font It Ain't a-Changing

I questioned a spokesperson at NLS as to whether or not there are plans to replace the Kaypro 10 character font set. There aren't, but I think serious thought should be given to it.

When opting for a computer with as much memory as the Kaypro 10, many purchasers will expect to spend a lot of time in front of the video display working at entering and extracting text and data from the computer.

NLS gets an A+ for
coming out with a machine
of this nature; it's a
whole new ball game in the
transportable field.

I think a character font that looks cluttered induces an unneeded fatigue factor. Unlike the video display of the Kaypro II character font, the one used on the Kaypro 10 is poorly designed. For example, in uppercase, the word "LIBRARY" looks run together.

The Kaypro 10 differs from the Kaypro II in more than memory. It's black with battleship-gray letters—"kind of sinister-looking," in the words of one computer store customer.

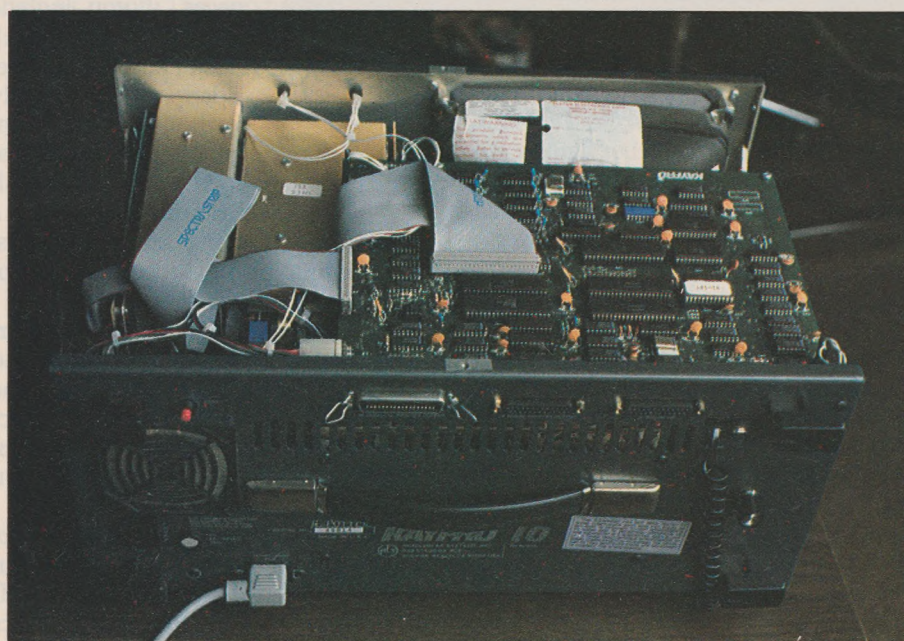
The blue of the Kaypro II says, "Come, I welcome you." I wonder if other people are put off by the "sinister" black and gray of the Kaypro 10?

By the time you read this, the Kaypro 10 will have a Config program. The machine I evaluated didn't have one. Consequently, I missed being able to reconfigure the cursor keys and the keypad for the various software application packages I tried on the Kaypro 10. For example, I like to be able to have full use of the numbers on the top of the keyboard when I am working with a word processing program that reprograms my numeric keypad.

Unlike the Information Engineering IE Prom's Activate Program, which I use on my Superbrain, the Kaypro II's Config program allows only a one-to-

	To Turn On:	To Turn Off:
Assembly Language	27,'B','7'	27,'C','7'
S-Basic	print chr(27);'B','7'	print chr(27);'C','7'

Table 1. A sequence to implement the Kaypro 10's status line.



A rear view of the Kaypro 10.

PROGRAMMER'S TREAT.

JRT's language triple-dipper. Pascal 3, of course, and now two exciting new flavors: zippy Pascal 4 and exotic Modula-2. They'll make every programmer's mouth water; try 'em. (Sorry—no plain vanilla.)

PASCAL 3: THE WORLD'S MOST POPULAR CP/M* PASCAL.

The industry's standard. Compared to Basic, expect to write programs three to ten times faster with JRT Pascal 3.

Modular programming lets you easily handle big programs, and use common modules in several programs. Self-documenting code. Verbal error messages. 12 data types. 3 looping statements. Strings up to 64K. Dynamic storage ends memory waste.

You can pay ten times more—but why? The sweetest Pascal is also the sweetest Pascal bargain.

NEW PASCAL 4: TWICE AS FAST AS 3.

JRT Pascal 4 has all of 3's great features—refined. To make a long story short, we fine-tuned the compiler's critical components. Result: speed. 3 was already the fastest Pascal compiler, and new 4 is twice as fast! If your taste is speed, Pascal 4 is for you.

ALL NEW MODULA-2: TODAY'S ULTIMATE MICRO LANGUAGE

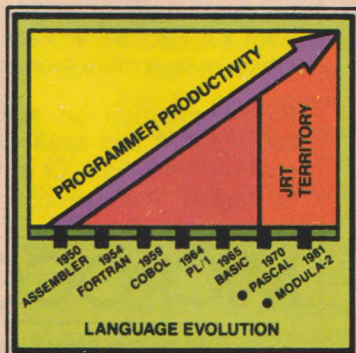
The latest creation from Pascal's designer, Prof. Nicklaus Wirth. Evolved from 12 years Pascal experience, Modula-2 is even more powerful, concise, and easy-to-learn.

Modula-2 refines Pascal's syntax and adds:

- The MODULE concept—similar to Pascal's external procedures but much more flexible. Build up a module library; use common modules for many programs.
- The compiler type-checks across modules so they correctly reference.
- The PROCESS concept for multi-programming; supports process creation, monitors, signals.
- PROCEDURE VARIABLES for new program control possibilities.
- LOW-LEVEL FACILITIES give direct hardware control.
- And there's much, much more.

Does our menu whet your appetite? Then why not treat yourself to easier, faster, more efficient JRT programming?—today.

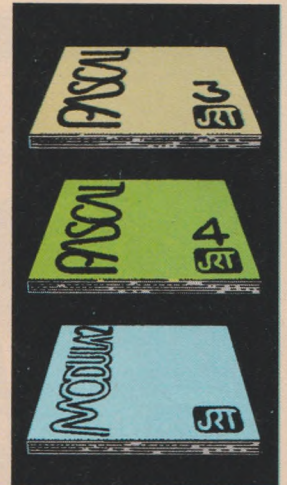
Experience proves: the more modern the programming language, the more productive the programmer.



JRT PASCAL 3.
Modular programming, self-documenting code, verbal error messages, 3 looping statements, 12 data types, strings up to 64K, dynamic storage.

NEW JRT PASCAL 4.
4's many refinements double the already fast compiling speed of Pascal 3.

NEW JRT MODULA-2.
This newest language from Prof. Nicklaus Wirth refines Pascal's syntax and adds: Module and Process concepts, Procedure Variables, Low-Level Facilities.



JRT Systems include: manual, 8" or 5 1/4" diskette, reference card (Pascal), and postage paid within North America. In the boxes provided, specify the diskette format you need. A 60K CP/M system is required; *CP/M is a Digital Research TM.

PLEASE SEND ME:

☐ **Pascal 3 System**\$39.95
5 1/4" ☐ Apple, CP/M ☐ Kaypro ☐ Superbrain
☐ 8" diskette ☐ Heath, hard sector ☐ Northstar ☐ Televideo
SSSD for ☐ Heath, soft sector ☐ Osborne ☐ Xerox 820
diskette ☐ Manual only19.95

☐ **Pascal 4 System** (specify diskette below)\$69.95
☐ Manual only19.95

☐ **Modula-2 System** (specify diskette below)\$99.95
☐ Manual only19.95

☐ **Pascal Format Program** (specify diskette below)\$29.95
This program neatly "pretty prints" or formats your Pascal programs with standard indentation and upper or lower case conversions.

Specify here for Pascal 4, Modula-2, and Pascal Format Program diskette.

☐ 8" diskette. ☐ 5 1/4" diskette for ☐ Apple, CP/M ☐ Kaypro ☐ Osborne.

☐ Check ☐ C.O.D. (add \$5) ☐ VISA ☐ MasterCard ☐ American Express
(California residents add 6% sales tax. Outside North America, add \$15.
Checks must be in U.S. dollars and drawn on a U.S. bank.)

CARD # _____ EXP. _____

SIGNATURE _____

NAME _____

ADDRESS _____

CITY, STATE, ZIP _____

Phone toll-free **800-932-3320**

(In California, 800-433-7519. These toll-free numbers are for orders only. For service, phone 415-388-0530.)

JRT SYSTEMS, INC.
45 CAMINO ALTO / G5
MILL VALLEY, CA 94941

Dealer
inquiries
invited



JRT products will be available for the IBM/PC in PC-DOS and CP/M-86 formats about January 1, 1984.

one hex substitution, compared with IE's option of adding three hex codes to the numeric keypad and up to five on the keys at the top of the keyboard.

I only hope that NLS provides for

something like this when the Config program is shipped. Being able to reconfigure certain keys in the absence of additional keyboard function keys is a real boom to those per-

sons using word processors that require the pushing of two or three keys to make the program do something.

I got around this difficulty by using Smartkey to reprogram designated keys. If you purchased a Kaypro 10 after August 1 and found MicroPlan wasn't to your liking, you probably investigated other spreadsheets.

I tried Sorcim's SuperCalc2, and it works like a charm—beautiful. However, I called and talked with someone at Sorcim and he said they didn't have SuperCalc2 ready for the Kaypro family. When installed for the ADM-3A machine, SuperCalc2 runs perfectly on the Kaypro 10. Of course, inverse video is not implemented, so what you get is the generic machine variety of SuperCalc2.

I also tried Microcomputer Taxsystems' Micro-Tax on the Kaypro 10. All of you one-person tax people out there should take a look at this Kaypro 10/Micro-Tax combination.

Set to run on my Kaypro II, the full Micro-Tax package of the Individual, Partnership and Corporation ran like a dream on the Kaypro 10.

If you're doing taxes as a business

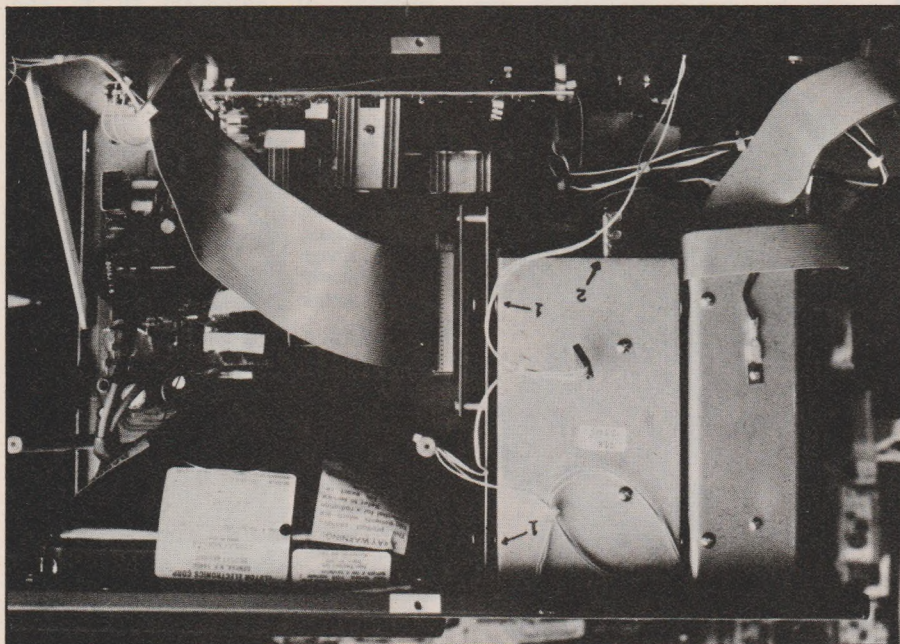
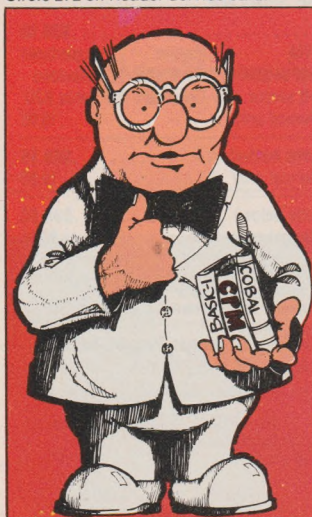


Photo 1. A look inside the Kaypro 10.

Circle 272 on Reader Service card.



Gurmial is Coming...

"Gurmial buys a Computer" 1984 Calendar

Share in the adventures of Gurmial each month with a new hilarious, side splitting scene from the "Gurmial Buys a Computer" calendar for 1984. Gurmial stumbles through the world of Hardware, Software and Robotics from the Corporate Office to his home.

The Gurmial 1984 Color Calendar

Please send me
copy(s) of the "Gurmial Buys a
Computer" Calendar for 1984
@\$6.95 (Utah residents add 5.25%
sales tax) +50¢ postage &
handling to:

Computer Humor, Inc.
P.O. Box 859
Park City, UT 84060

©1983 Computer Humor, Inc.



Dealers SELL

Selling *Microcomputing* will
make money for you.
Consider the facts:
Fact #1: Selling *Microcomputing*
increases store traffic—our
dealers tell us that *Microcomputing* is
the hottest-selling computer magazine on
the newsstands.

Fact #2: There is a direct correlation between
store traffic and sales—increase the number of people
coming through your door and you'll increase sales.

Fact #3: Fact #1 + Fact #2 = INCREASED SALES,
which means more money for you. And that's a fact.

For information on selling *Microcomputing*, call
800-343-0728 and speak with Ginnie Boudrieau, our
bulk sales manager. Or write to her at *Microcomputing*,
80 Pine St., Peterborough, NH 03458.

MICROCOMPUTING

80 Pine Street Peterborough, NH 03458

800-343-0728

for others, I think the Kaypro 10 with Micro-Tax will help you make your workload much more manageable.

WordStar, with the inverse video option working, gets high marks. If you've never used WordStar with inverse video, you're in for a treat. The clarity of the WordStar menu is greatly enhanced on the Kaypro 10. Even I like it on the Kaypro 10, and I'm a Magic Wand fan. However, when the Random House Thesaurus is added to WordStar, it makes a hash of the program's menu area. You can get it back to normal by invoking any of the WordStar menus and then returning from the menu with the space bar. A disjointed bar on the bottom line of the menu remains, even after getting out of the thesaurus. Also jumbled is the first word on the top thesaurus line, but you can still make the program substitute words properly.

A Hard Beauty

This is the first time I've worked with a hard disk and I like it. Aside from the noise of the Kaypro 10's fan, it's a beauty to operate. A visitor during evaluation immediately went to the window. When I asked what was wrong, he replied seriously, "I think I hear a truck somewhere."

My wife came in and pointed out the fan in the Kaypro 10. It's really not as noisy as a truck, but compared with the Kaypro II, which makes no noise when not accessing a disk, it's noisy.

A fan is a fan and it makes noise—certainly no more than the fan on my Superbrain—but it's a distraction I hope American know-how will solve.

Speaking of the fan, the Kaypro 10 User's Guide recommends:

Occasionally remove the grill which holds in the foam filter on the back panel of the Kaypro 10. Clean the filter by gently agitating it in water and mild soap or detergent. Let it dry, replace it and replace the grill.

After a week's use, I found quite an accumulation of dust on the filter. I suspect that owners may want to check this more than occasionally.

Using a hard disk is different. I found out that you don't just turn the machine off when you're done. Doing so may cause some harm if the machine is transported in such a condition. There is a Safety.com program that must be run before shutting off the machine. NLS might be advised to provide a metallic-type sticker on the front of the hard disk drive as a re-

minder of this important requirement. It's first mentioned on p. 27 of the user's guide.

They use the word "imperative" in connection with the warning that the head of the hard disk be in the safety zone before shutting off the machine. I think such a prominent word needs a more prestigious position in the manual.

Micro for All Walks of Life

I like programming, and the graphics capability of the Kaypro 10 gives the programmer a chance to make displays that aid in data entry and display of information. NLS gets an A+ for coming out with a machine of this nature. Price comparisons go out the window; it's now a whole new ball game in the transportable field.

For whatever use,
the Kaypro 10 should
pay its way.

This is a machine that should free the writer to do his writing without worrying about space left on a disk for back-up copies.

It will give the tax preparer room to work during the busy season. It will give the small-businessperson a place to keep the inventory on-line, instead of having to put in and take out a number of different disks.

Nonprofit clubs and groups should also take a good look at this machine. The hard disk makes an ideal filing cabinet for records to be transferred from one set of officers to new, incoming ones.

When the promised Uniform program for the Kaypro 10 is ready, with its nearly 30 different computer disk formats, this machine will be worth its salt to programming companies that sell their programs on disks.

The problems involved with the transfer of programs on one 5¼-inch disk in drive A to another disk in drive B are virtually eliminated when the transfer is done from hard disk to floppy disk. One reason is that drives A and B might not rotate at the same speed. This can cause errors in the file-transfer process. Incompatibilities in the disk drive speed, which account for a great number of the faulty disk transfers, were a thing of the past dur-

ing my testing of this process on the Kaypro 10.

Sports psychologists keeping data for professional sports teams will find the Kaypro 10 a tool with sufficient memory to make their tasks more efficient.

With the Olympics coming up, a transportable with megabytes of memory would be a welcome addition to coaches and trainers.

American businesses with an eye toward helping Americans in their favorite sports should consider donating a Kaypro 10 to sports associations training for the Olympics.

Whatever use you put the Kaypro 10 to, it should prove to pay its way. ■

Circle 172 on Reader Service card.

Maxell Floppy Disks

The Mini-Disks
with maximum quality.



Dealer inquiries
invited. C.O.D.'s
accepted. Call
FREE (800) 235-4137.

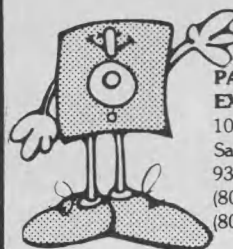


PACIFIC EXCHANGES
100 Foothill Blvd., San Luis
San Luis Obispo, CA 93401.
In Cal. call (800) 592-5935 or
(805) 543-1037.

Circle 172 on Reader Service card.

MEMOREX FLEXIBLE DISCS

**WE WILL NOT BE UNDER-
SOLD!!** Call Free (800) 235-4137
for prices and information. Dealer
inquiries invited and C.O.D.'s
accepted.

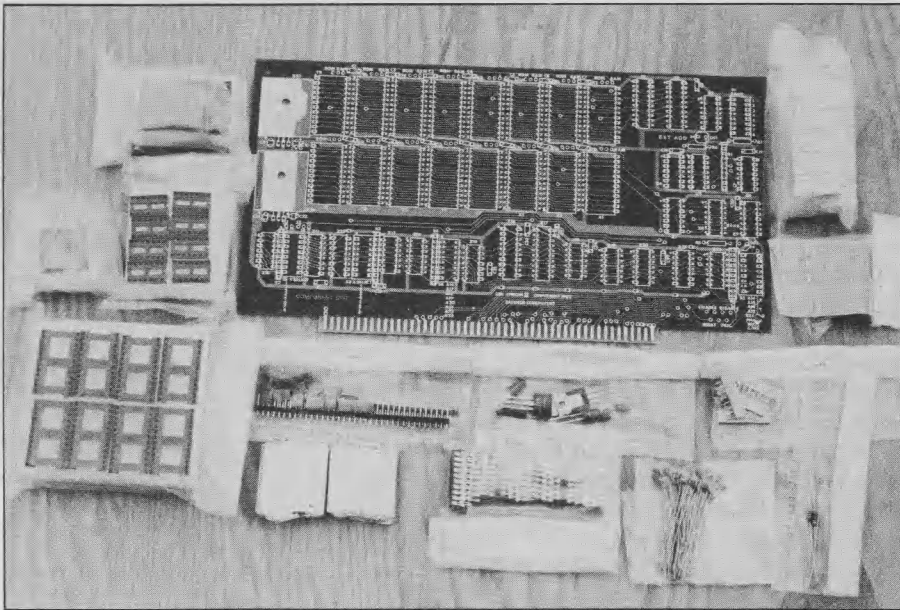


**PACIFIC
EXCHANGES**
100 Foothill Blvd.
San Luis Obispo, CA
93401. In Cal. call
(800) 592-5935 or
(805) 543-1037

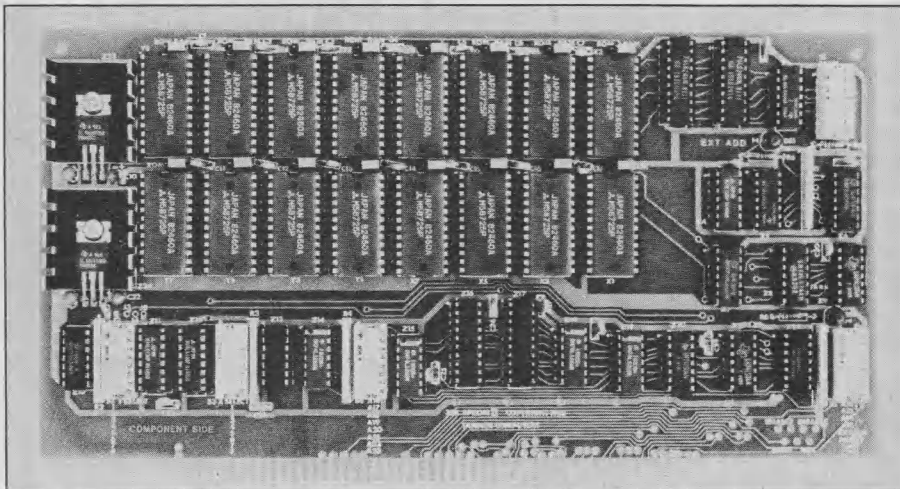
Satisfying Your Lust For Memory

Digital Research's 32K RAM board makes filling the memory space of your S-100 computer affordable (finally!).

By John Uffenbeck



Contents of Digital Research's 32K static RAM kit as packaged and shipped.



Completed memory board.

Adding memory to an S-100 bus computer can be an expensive proposition. I still remember buying my first microcomputer (an Altair 8800), building the kit and then discovering I needed memory to make the darned thing work! A hundred and eighty-six dollars later, I was the proud owner of a 4K static RAM kit.

As the years went by, I became envious of Apple and TRS-80 owners. They could add 16K of RAM simply by plugging eight 4116 dynamic RAM chips into the empty sockets on their motherboards.

I remember seeing 16K expansion kits advertised for \$49.95. And this was at a time when an 8K static RAM board for the S-100 bus would set you back \$120. Once I even went so far as to buy a 32K dynamic RAM board, but it didn't work.

I learned another lesson: the "standard" S-100 bus wasn't really all that standard. So back went the dynamic board, and my search for the ideal memory card continued.

I Found It!

Well, folks, I think I may have found it! In the November 1982 issue of *Microcomputing*, Digital Research Computers of Garland, TX, advertised a 32K static RAM kit. It used HM6116 or TM2016 2K \times 8 (byte-wide) static RAM chips. The price was

John Uffenbeck (Route 2 Box 56, Cable, WI 54821), an electrical engineer, authored the 1983 Prentice-Hall book Hardware Interfacing With the Apple II Plus.

\$169.95. A blank board with sockets costs \$57.95. Now that's more like it!

In January 1983, the price of the RAM kit fell to \$139.95 (assembled and tested for \$179.95). I could wait no longer. I placed my order for the kit version and enclosed a money order for \$141.95 (personal checks are accepted but will take a couple of weeks to clear). Twelve days later, I received my insured package.

Assembly Info

My kit was well-packaged and protected against possible shipping ravages with styrofoam "peanuts." All parts were separated by type and enclosed in individual plastic bags. The 16 static-sensitive RAM chips were wrapped in tin foil.

You should have little
trouble assembling this card.

Just be sure you have a
low-wattage soldering pencil—
and take your time.

The PC card, the critical part of the kit, appears to be professionally done. A silk screen on the component side of the board aids in identifying the proper placement of parts, and a solder mask was used to prevent bridging between adjacent pins.

Needless to say, there were no jumper wires. (Don't laugh—some of the early S-100 cards were famous for them!)

The instructions with the kit were of the "install and solder" variety, but the silk screening made it clear where all parts were to be mounted. It took me about four hours from unpacking to final test in my North Star Horizon mainframe. The largest part of that time was spent soldering in the 51 sockets and then figuring out how to set the five configuration switches.

You should have little trouble assembling this card. Just be sure you have a low-wattage soldering pencil—and take your time. I figure at \$40 more for the assembled version, my four hours were worth \$10 an hour.

If you have never assembled a kit before, I would recommend purchasing the assembled version. There's no point in learning how to solder by practicing on a \$140 memory board! [Note: Digital Research Computers

will repair the board for you at a cost not to exceed \$20 without prior approval.)

The only confusion I had in assembling the kit was a reference to AUGAT pins or shorting posts. My kit included two long strips of shorting posts with 18 pins on each.

After reading the instructions several times, I decided that I was supposed to cut these strips into groups of three. The pins then insert into the board above the RAM/EPROM sockets. Small shorting blocks are used to select each socket as a RAM or EPROM.

Features of the Board

The board has several features that

should make it attractive to S-100 owners. Because the 2K RAM chips are pin-compatible with 2716-type EPROMs, the board may also be used as an EPROM card. Or, you may mix EPROM and RAM in any order.

For example, you might want 8K of EPROM followed by 8K of RAM. The shorting blocks allow you to define each socket as an EPROM or RAM.

Another nice feature is that individual sockets may be disabled, allowing you to overlay a bootstrap ROM located in the middle of your memory space.

Two 7805 heat-sinked voltage regulators are used to supply +5 V to all chips. The manufacturer states that



Protective Custody

Your computer may be safe and sound at home or office, but how are you going to protect that major investment when you move or travel? Hard knocks and baggage rooms can reduce your hi-tech hardware to lo-tech junk in a microsecond. Unless of course, you have wisely secured a Flight Form or C-Series case **specifically designed to protect computer hardware**. A tough outer shell and thick foam interior holds and protects your computer from the

pitfalls of travel and pratfalls of handling. There's even room for software and paperwork! We've got one for most major computer brands, or we'll custom build you one. Prices start as low as \$102 — a pittance for protection! Visa & M/C welcome. Cases, Inc., 13102 Stone N, Seattle, WA 98133 (206) 365-5210.

Cases, Inc.

See us at the Vegas Comdex Show!

the typical power consumption is 300 mA; I have no cause to question this. After several hours of operation, the heat sinks are only moderately warm.

The board fully supports the new IEEE-696 standard for the S-100 bus. For example, did you know that the bus is now defined for more than 16 megabytes of RAM? (Now *that's* what I call really lustful!)

This is accomplished by defining eight additional bus pins as address lines A16-A23 ($2^8 = 16,777,216$). By setting a switch, you can put the 32K

card into any 1 of 256 different 64K memory spaces. More on this later.

The card also supports the phantom line that allows the board to be disabled when bus pin 67 is pulled low (i.e., phantom asserted).

Because many 2716 EPROMs have 400-450 ns access times, they will not run in a 4 MHz computer. By setting another switch position, you can add one wait state and accommodate these slower chips (of course, the whole board is slowed down when you do this).

Finally, the board supports a bank-selecting scheme that allows you to disable the card from software.

RAM Kit Documentation

The documentation supplied with the kit consists of seven photocopied pages. This includes a parts list, assembly instructions, details on how to set the five switches and a paragraph on theory of operation.

It's nice to know that when you buy that 68000 CPU card someday and you want to add 16 megabytes of RAM, your 32K RAM card will be ready!

The last page is a hand-drawn schematic of the board, and it just barely fits on the page (my copy was clipped off on one edge). The schematic is compact but readable.

A mild complaint here is that the switches are not labeled on the schematic, so it's up to you to figure out which one is which. And if you notice something that looks like "ph" on many of the open pins, it means "pulled high" to +5 V. I puzzled over that for quite a while! I would guess that a more professional schematic will be forthcoming.

Setting the Switches

As I said earlier, there are five switches used to select the various options possible and to define the address of the board in your system. Fig. 1 summarizes the function of each

	1	2	3	4	5	6	7	8	
Switch 1	X	X	X	X	X	X	X	X	Bank select. Set one switch only to On to define the bank.
	Y1	Y2	Y3	Y4	Y5	Y6	Y7	Y8	
Switch 2	1	1	1	1	1	1	1	1	Y select. Set switch to Off to disable any chip.
	X1	X2	X3	X4	X5	X6	X7	X8	
Switch 3	1	1	1	1	1	1	1	1	X select. Same as Y select.
	A16	A17	A18	A19	A20	A21	A22	A23	
Switch 4	X	X	X	X	X	X	X	X	Set switches to correspond with extended address.
	A14	A15	A14	A15	EXT	ADR	PHT	WAT	20H
Switch 5	0	0	1	0	0	0	0	0	1
	X		Y						

Fig. 1. Five switches are used to select the operating mode of the card. The settings shown place the card in the bottom 32K of memory space and disable the phantom, extended address and wait state generator.

Circle 329 on Reader Service card.

IT'S SIMPLE. . .CALL AND SAVE MONEY!

Since 1978

1-800-841-0860

**GA. & INFO
912-377-7120**

**TELEMARKETING COMPUTERS
AND EQUIPMENT
TO SAVE YOU
MONEY!
FREE UPON REQUEST**

*DISCOUNT PRICE LIST AND INFORMATION KIT
*COPY OF MFR'S WARRANTY
PRICES AND PRODUCTS ARE SUBJECT TO CHANGE
WITHOUT NOTICE.

**TRS-80
COMPUTERS
UP TO
20%
DISCOUNT**

**MONITORS
AMDEK
TAXAN USI
*CALL**

F FRANKLIN
ACE 1000 ACE 1200
***CALL**

PRINTERS
EPSON SCM TP-1 OKIDATA
STAR C.I.TOH BANANA

C commodore
64 EQUIP.
***CALL**

CARDS
QUADRAM
MICROTEK
GRAPPLER+


**MicroManagement
Systems, Inc.**
2803 Thomasville Road East
Cairo, Georgia 31728
TELEMARKET DEPT. 7

switch.

Thinking of the board as two 16K blocks labeled X and Y, there are four possible locations for these blocks in a 64K memory space. The four combinations of address lines A14 and A15 define the absolute addresses of the four blocks, as shown in Fig. 2. Selecting the memory block you want simply requires you to set switch positions 1 and 2 (for block X) and positions 3 and 4 (for block Y).

Position 5 of switch 5 enables the board for extended addressing. If selected, the high-order address (A16-A23) must match the switch settings of switch 4. Of course, if your processor puts out only 16 address lines, you don't need extended addressing and position 5 of switch 5 should be off. However, it's nice to know that when you buy that 68000 CPU card someday and you want to add 16 megabytes of RAM, your 32K RAM card will be ready!

Position 6 of switch 5 selects the phantom feature. When this switch is on, the board will respond to the phantom signal on pin 67 of the S-100 bus. When would you use this?

Consider that you might put 32K of EPROM in the card at some point.

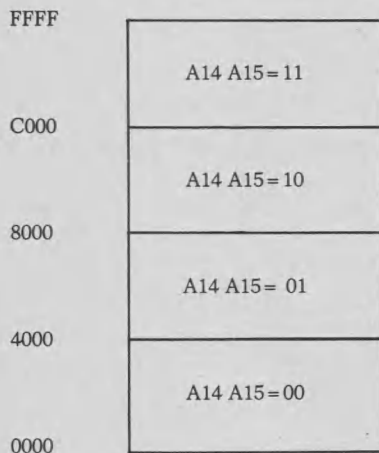


Fig. 2. The 32K card can be configured as two 16K blocks. Positions 1-4 of switch 5 are used to select two 16K blocks in the memory space shown.

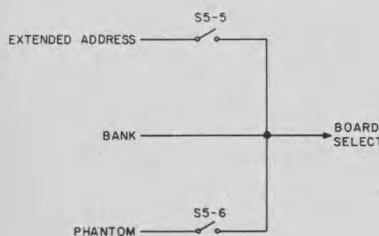


Fig. 3. The RAM card can be disabled and made to disappear from the computer's memory space when the Board Select signal goes low.

This would reduce your system memory to 32K of RAM and be a hindrance when running larger software packages (for example, it would restrict you to a 32K CP/M).

With the phantom line, you can disable the card and overlay it with another 32K RAM card. Now when you want to use the 32K ROM, you would disable the RAM card; of course, this means that the RAM card must also support the phantom feature. Often, a computer system is booted up with a ROM that disappears (like a phantom) after doing its job by relinquishing its memory space to RAM.

Position 7 of switch 5 allows selection of a wait state for slow EPROM chips. This causes the processor to

With two cards, you can fill your computer's memory space for less than \$300.... So now I don't have to envy my Apple and TRS-80 friends anymore. In fact, they might even envy me...

wait one extra clock cycle for each memory read machine cycle. If you're unsure of the access times of your EPROM chips, try reading them or executing a program in ROM with this switch set to Off. If unreliable operation occurs, set the switch to On. Realize, however, that you will be slowing down the entire board—not just the access to the EPROM.

Position 8 of switch 5 sets the bank select port to 20H when on and 40H when off. This is supposed to be compatible with the definitions of bank selecting set up by North Star and Cromemco, respectively. More on this in a moment. But first, what exactly is bank selecting?

There are three ways to disable (or make "invisible") this memory card (see Fig. 3). The board is enabled only if the Board Select signal is high (a logic 1).

Thus, if S5-5 is closed and the extended address does not match (Extended Address=low), the board is disabled. If S5-6 is closed and Phantom=low, the board is also disabled. Finally, if Bank=low, the board will be disabled.

The bank select feature is built into the card and cannot be switched off as

the extended address and phantom features can. However, the board will power on with Bank=high.

This means the board normally will power on enabled, but by writing to the bank select port (20H or 40H), you can disable it. As a result, if you don't care about bank selecting, forget it; the board will always be enabled anyway.

Switch 1 defines the bank number for the card. Only one of the eight switches should be set on at a time. This means there is a theoretical maximum of eight banks of 64K and 16 boards (two boards per 64K).

The following 8080 machine code will turn on bank 3 and turn off all others.

```
MVI A,40H ;bank 3 is ON 0000100
OUT 20H ;S5-1=ON
```

This is a minor problem North Star users should be aware of. When S5-1 is on, the bank select port is set to 20H. This is supposed to be compatible with North Star's bank select port. But it isn't. My North Star 16K dynamic RAM board uses port C0H.

I called the North Star people to see if they had changed the port address in their newer RAM cards. But they haven't. All North Star RAM cards (16K, 32K and 64K) use port C0H as the standard bank select port.

I don't think this is a major problem, but if you're using the bank-selecting feature, you had better check your system software to make sure it works properly with this card.

Finally, switches 2 and 3 allow you to disable any selected chip in the 16 memory chip array. With this technique, you can introduce 2K "holes" in your memory space to accommodate monitor and bootstrap ROMs.

The switch settings shown in Fig. 1 put the X block at location 0 and the Y block at location 4000H, disables the extended address, phantom and wait states, and selects port 20H as the bank select port. The Xs represent "don't-care" settings because the bank select and extended addressing functions are not used.

Endorsement

As you can tell, I heartily endorse Digital Research's new 32K RAM/EPROM board. With two cards, you can fill your computer's memory space for less than \$300 (in fact, there is a 64K version of this card selling for \$269 in kit form!).

So now I don't have to envy my Apple and TRS-80 friends anymore. In fact, they might even envy me... ■

CHAMELEON

by SEEQUA

Compatible With Your Environment

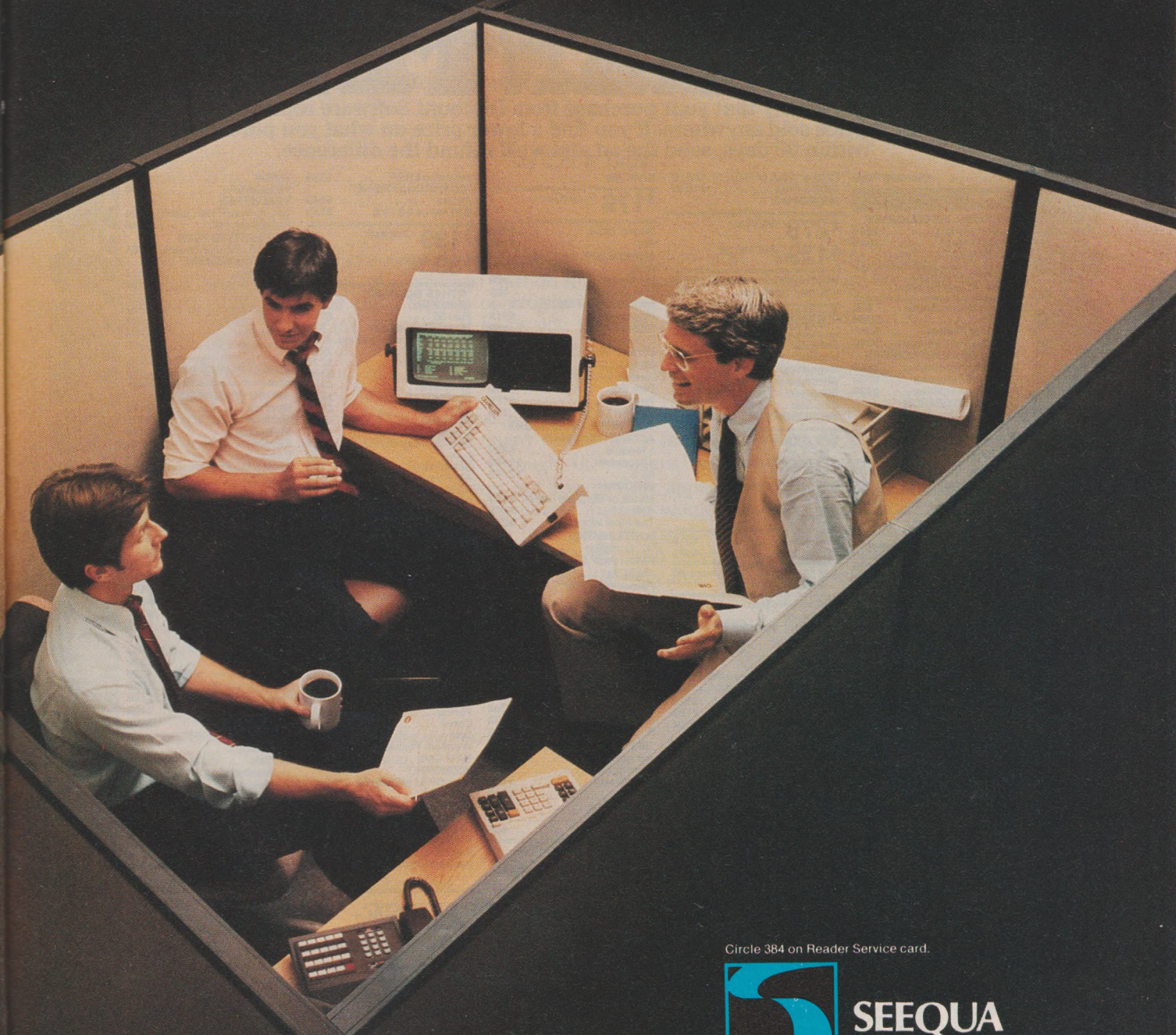
- IBM Compatible
- CP/M™ Compatible
- \$1995 Complete*



For business, professional and personal computing, Chameleon is the tool that works as hard as you do. It's there where you need it, when you need it. Complete with word processing and spreadsheet software at no extra cost. Put Chameleon in your environment. It blends right in.

Find out more at your authorized Chameleon dealer. For the one nearest you call 1-800-638-6066.

*Manufacturers list price. Includes 320K disk storage. 128K RAM, dual 8 and 16 bit processor. Perfect Writer word processing software, Perfect Calc spreadsheet software...and more.



Circle 384 on Reader Service card.



SEEQUA
COMPUTER
CORPORATION

8305 Telegraph Road
Odenton, MD 21113
(301) 672-3600 or
(800) 638-6066

The following are registered trademarks:
IBM — International Business Machines
Perfect Writer — Perfect Software
Perfect Calc — Perfect Software
CP/M — Digital Research Inc.

LOWEST SOFTWARE PRICES GUARANTEED

We hereby certify that your purchase from Discount Software represents the lowest price sold anywhere. If you find a lower price on what you purchased within 30 days, send the ad and we'll refund the difference.

Discount Price CP/M

ARTIFICIAL INTELLIGENCE

Medical (PAS-3)\$849
Dental (PAS-3)\$849
ASHTON-TATE

\$4?? dBASE II...
call for price

dBASE User's Guide\$29
Friday!\$265
Financial Planner\$595
Bottom Line Strategist\$349
ASYST DESIGN/FRONTIER
Prof Time Accounting\$549
General Subroutine\$269
Application Utilities\$439
DIGITAL RESEARCH
CP/M 2.2
Intel MDS\$135

\$149 Northstar

\$159 TRS-80 Model II
(P&T)

Micropolis\$175

\$98 CBasic-2

Display Manager\$319
Access Manager\$239

\$449 PL/1-80

BT-80\$179
MAC\$95
RMAC\$179
Sid\$65

\$90 Z-Sid

DeSpool\$49
CB-80\$459
Link-80\$90

FOX & GELLER

Quickscreen\$135
Quickcode\$265

\$65 Dutil

DGraph\$265
MICRO DATA BASE SYSTEMS
Knowledge Man\$429
HDBS\$585
MDBS\$1099

DRS or QRS or RTL.....\$319 MDBS PKG.....\$1999 MICROPRO

\$279 WordStar

\$179 Mail Merge

WordStar/Mailmerge\$399
WS/MM/SpellStar\$549

\$199 SpellStar

DataStar\$249
InfoStar\$349
ReportStar\$254
Wordmaster\$119
Supersort I\$199
Calc Star\$129
MICROSOFT

\$249 Basic-80

\$329 Basic Compiler

\$349 Fortran-80

\$549 Cobol-80

Multiplan\$219
M-Sort\$175

\$159 Macro-80

MuSimp/MuMath\$224
MuLisp-80\$174

ORGANIC SOFTWARE

Textwriter III\$111
Datebook II\$269
Milestone\$269

OSBORNE (McGraw/Hill)

G/L, or AR & AP, or PAY\$59
All 3\$129
All 3 + CBASIC-2\$199
Enhanced Osborne\$299

PEACHTREE

G/L, A/R, A/P, INV(each).....\$399
PB VersionAdd \$234
Peachcalc\$249
Peachpak

(G/L, A/R, A/P)\$349

STAR COMPUTER SYSTEMS

G/L, A/R, A/P, Pay(each).....\$349
All 4\$1129
Legal or Property Mgt.\$849

STRUCTURED SYSTEMS

Business Packages (call)

SORCIM

\$179 SuperCalc I

SuperCalc II\$265
Act\$157

SUPERSOFT

Ada\$270
Diagnostic II\$89
Disk Doctor\$89

Forth (8080 or z80)\$149

Fortran\$319

Ratfor\$79

C Compiler\$225

Scratch Pad\$266

StatsGraph\$174

Analiza II\$45

Disk Edit\$89

Term II\$179

Utilities I or II\$54

**SOFTWARE DIMENSIONS/
ACCOUNTING PLUS**

1 Module\$399

4 Modules\$1499

All 8\$2799

UNICORN

Mince or Scribble (each).....\$149

Both\$249

The Final Word\$270

WHITESMITHS

"C" Compiler\$600

Pascal (incl "C")\$850

"PASCAL"

Pascal/MT+ Pkg\$429

Compiler\$315

SP Prog\$175

Pascal Z\$349

Pascal/UCSD 4.0\$349

DATA BASE

dBASE IICall 4??

Friday\$265

FMS-80\$799

FMS-80-1\$399

Condor I & IIICall

Selector\$689

Superfile\$159

"WORD PROCESSING"

Perfect Writer\$389

WordSearch\$114

SpellGuard\$139

Peactext\$289

Spell Binder\$349

Select\$495

The Word\$65

\$145 The Word Plus

Palantier-1 (WP).....\$385

"COMMUNICATIONS"

Ascom\$149

BSTAM or BSTMS\$149

\$139 Crosstalk

\$89 Move-it

"OTHER GOODIES"

Micro Plan\$419

Plan 80\$264

Target PlannerCalc\$79

Target Financial Modeling.....\$299

Target Task\$299

MicroStat\$224

Vedit\$130

MiniModel\$449

StatPak\$449

Micro B+\$229

String/80\$84

String/80 (source)\$279

ISIS CP/M Utility\$199

Lynx\$199

Supervyz\$95

ATI Power (tutorial)\$75

Mathe Magic\$95

CIS Cobol\$765

Forms II\$179

Basic\$149

Zip MBasic, CBasic
(each)\$129

APPLE II

ASHTON-TATE

(See CP/M Ashton-Tate)

BRODERBUND

G/L (with A/P)\$444

Payroll\$355

INFO UNLIMITED

EasyWriter (Prof)\$155

EasyMailer (Prof)\$129

Datadex\$134

MICROSOFT

Softcard (Z-80 CP/M)\$249

Fortran\$179

Cobol\$549

Tasc\$139

Premium Package\$549

RAM Card\$89

MICROPRO

(See CP/M Micropro)

Z-80 Card\$299

VISICORP

Visicalc 3.3\$189

Desktop/Plan II\$219

Visiterm\$90

Visidex\$219

Visitrend/Visiplot\$259

Visifile\$219

Visischedule\$259

PEACHTREE

G/L, A/R, A/P, PAY, (each).....\$224

PeachPack P40\$349

ACCOUNTING PLUS

G/L, AR, AP, INV, (each).....\$385

"OTHER GOODIES"

Dow Jones\$314

Incredible Jack\$129

Super-Text II\$127

Data Factory\$269

Mini Factory\$139

DB Master\$184

Versaform VS1\$350

**IBM PC, 16 BIT 8,
DISPLAY WRITER**

"WORD PROCESSING"

Wordstar\$289

Spellstar\$199

Mailmerge\$179

Easywriter\$299

Easyspeller\$159

Select/Superspell\$335

Write On\$115

Spellguard\$189

Spellbinder\$349

Final Word\$264

Wordex\$159

Edix\$159

"LANGUAGES & UTILITIES"

Crosstalk\$139

Move-it\$129

BSTAM or BSTMS\$149

Pascal MT+ /86, SPP\$679

CBasic 86\$294

Act 86\$157

Trans 86\$115

XLT 86\$135

MBasic (MSDOS)\$329

MBasic Compiler (MSDOS).....\$329

Cobol (MSDOS)\$649

Pascal (MSDOS)\$429

Fortran (MSDOS)\$429

"C" (MSDOS)\$429

"OTHER GOODIES"

SuperCalc II\$265

VisiCalc\$219

Visiplot/trend\$259

Visidex\$219

Easyfiler\$359

Mathemagic\$95

dBase IICall 4??

Friday!\$265

Statpak\$449

Optimizer\$174

Desktop Plan\$259



**Complete Software
Buyer's Guide
(\$5.00 value)**
Filled with facts and
usable advice about
scores and scores of
software programs from
accounting and business
systems to word processing
and utilities.

**Exclusive
"Hotline"**
Our reputation for cour-
teous and knowledgeable
service has resulted in calls
from people who never
purchased our products.
Now a separate "hotline" is
available to customers only.

**Confidential
Software
BargainGrams**
Regular notices of insider's
bargains not available to
the general public.



DISCOUNT SOFTWARE
Outside Continental U.S.-add \$10 plus Air
Parcel Post. Add \$3.50 postage and handling
per each item. California residents add 6 1/2%
sales tax. Allow 2 weeks on checks. C.O.D. \$3.00
extra. Prices subject to change without notice.
All items subject to availability. *Mfr. trade-
mark. Blue Label \$3.00 additional per item.
CP/M is a registered trademark of DIGITAL
RESEARCH, INC.

**ORDER TOLL-FREE
VIA VISA OR
MASTERCARD:**

1 800 421-4003

or 1 213-837-5141

Calif: 1 800 252-4092

6520 Selma Avenue, Los Angeles, CA 90028

DISCOUNT SOFTWARE

M C883

Sorts Illustrated

If you've been putting off learning about sorting methods, this article will provide all sorts of information to get you started.

by Dick Lutz

When you're writing a Basic program that involves sorting of names or numbers, selection of the sorting method can be important to program speed. Sooner or later, it pays to develop an understanding of how sorting methods work, so you can make informed selections of when and why one method should be chosen over another.

Even if you're not a speed nut when you're devising programs, learning about sorting algorithms is a fascinating exercise. Some good textbook discussions are available for this purpose. In particular, *Basic and the Personal Computer* (Addison-Wesley), by Thomas A. Dwyer and Mar-

got Critchfield, provides a good (and painless) start on this and many other aspects of program writing in Basic. Also, it helps you to develop a sense of whether you want to pursue a given subject into more detailed territory.

As clear as the texts are, however, and as many times as I manually worked through the various methods, it was not always fully apparent how and why one method would be faster than another. In particular, real visualization of each sorting method is a challenge, because the time required to work through a large disordered array manually is just too great. Understanding becomes more

and more elusive as natural impatience and boredom set in.

Edification

For my own edification, I wrote Sortdemo.bas.

Sortdemo clearly visualizes three common sorting methods on the screen. It dramatically shortens the time needed to understand why one method beats another. In operation, it builds a disordered array of ASCII characters, displays it and then proceeds to illustrate a step-by-step sort by the methods known as bubble sort, quicksort, and fastsort. As it goes, it displays a report on how many comparisons and swaps were necessary to achieve order.

Critical Cycles

Comparisons and swaps are the critical factor in sorting, of course. They are what consume machine cycles—processing time.

At first glance, it might appear that the number of swaps would be wholly dependent on how much disorder there is in the array to be sorted. But these methods don't put each item in its final position the first time a swap is made. Rather, they achieve order by a step-by-step comparing and swapping process that *gradually* improves the order. So a given element may be compared with others many times, and its position may be changed many times. Sortdemo shows each comparison and each swap as it is made.

It's even entertaining to watch, so real learning takes place without serious gnashing of teeth. Because it will run completely unattended, it can be

100-199:	Master control
1000-1199:	Constants, defaults, dimensioning statements
1200-1499:	Main control loop
3000-3799:	Quicksort routine
3800-3999:	Fastsort routine
4000-4499:	Bubble sort routine
4500-4599:	Display control routines
4600-4640:	
4700-4780:	
4800-4849:	
5000-5040:	Default display controller if all sorts are off
6000-6099:	
7000-7090:	Create random string to be sorted
9000-9199:	Take new array length from keyboard
9200-9299:	Take new randomizer seed from keyboard
9300-9399:	Display count of runs
9400-9499:	Screen formatter
10000-10070:	Speed control
11000-11999:	Filter for controlling keyboard entries
12000-12137:	Speed changer
13000-13040:	Pause loop
14000-14070:	Cursor controller routine
14100-14130:	Pause to view finished sort
14200-14220:	Display control toggle specific to IMSAI VIO
15000-15160:	Cursor control constants for specific to IMSAI VIO
39000-END:	Instruction screens (optional)

Fig. 1. Outline of subroutines in Sortdemo.bas program.

Address correspondence to Dick Lutz, 531 Main St. N1611, Roosevelt Island, New York, NY 10044.

left to run continuously in a public situation—in a store window or in a display case.

Sortdemo's real strengths show up under interactive control by the user, who can slow things down to a crawl, or pause operation to think through what will happen next. Other factors are controllable, too:

- Randomizer seeding: Normally, the program constructs its disordered array by using the number of runs as the seed for MBasic's randomizer. But the user can supply the seed, thereby

causing repeat showing of particular arrays.

- Sorts may be turned on individually. One method can be viewed repeatedly, two can be compared or three can be seen one after the other.

- Actual display of the sorting processes can be turned on and off. Doing this provides a sense of how much time the display process requires.

- The statistical report of comparisons and swaps can be turned on and off.

- The size of the array can be

changed to observe the effect of array size on sorting speed by various methods.

Sorting Methods

Sorting algorithms work by making a comparison between two items and trading (swapping) them if they're out of order. The secret in speedy sorts is which two items are being compared—or, more carefully stated, where they are in the array.

The common bubble sort compares adjacent items. That means an item seriously out of place has to be compared and swapped many times before it gets where it should be.

Quicksort works with a bit more finesse, dividing the job into separate zones that are successively smaller, so that most individual items are compared only within their zone. Fastsort, also known as the Shell Sort, compares items that are half the array-size distance from each other, then a quarter of the distance, then an eighth, and so on.

These particular approaches to the problem are what Sortdemo illustrates.

Program Structure

Sortdemo is written in a reasonable approximation of structured Basic and is intended to serve as its own best documentation and explanation. Briefly, it consists of separate modularized subroutines for its different tasks (Fig. 1).

Adapting the Program

Sortdemo is written in Microsoft's MBasic, so it's readily adaptable to whatever dialect of Basic your machine requires. The display routines are also specific to the IMSAI VIO, but the program is structured so that, by changing only 15 lines in subroutine 15000, it can be adapted to almost any cursor-addressable terminal.

Display characteristics may also require one or more changes in the few lines marked with an asterisk; subroutine 14200, which changes the display layout on the IMSAI VIO, may be unnecessary.

The display subroutines use poke techniques intended for a memory-mapped display, so some rewriting in subroutines at lines 4500, 4700 and 10000 is necessary for non-memory-mapped displays. Depending on the speed of your processor, you may wish to change line 14110, which governs the loop that controls program speed. ■

Listing 1. Sortdemo.bas program.

```

100 'SORTDEMO.BAS Feb 11 '83
110 GOSUB 1000' Pick up constants
115 GOSUB 15000' Screen control strings
117 GOSUB 14200' Display 12x40
118 GOSUB 39000' Introduction & instructions
120 GOSUB 1200' -----SORT!-----> Continuous control loop
130 SYSTEM' Actual exit is from subroutine
199 '
1000 'Constants, dimensions, default/starting values
1010 SBASE = 61484!' * Display base (screen memory)
1012 QBASE = SBASE + 40' * Quicksort display base
1014 FBASE = SBASE + 80' * Fastsort display base
1016 BBASE = SBASE + 120' * Bubblesort display base
1019 TOPMAX = 31' * Largest allowable sort array
1021 MINMAX = 3' Smallest " "
1030 MAX = TOPMAX' Greatest length of sort string
1040 ' Defaults:
1050 SHOCNT = -1' No count
1060 TAKESD = -1' Don't take seeds
1070 DSP = +1' Display sort process on
1090 QUIK = +1' Quicksort on
1095 FAST = +1' Fastsort on
1097 BUBB = +1' Bubbler on
1100 STATS = +1' Swaps/Comps report on
1110 SPEED = +1' Default speed (fastest)
1120 SP$ = "g" Speed indicator "
1125 F$ = "###" PRINTUSING for Swaps, Comps
1130 FLAG = 0' Initialize for bubbler
1140 DIM ST(15,2), S(31), B(31)' Size of markerstack, sort array
1143 DIM SWP(3), CMP(3)' Swaps and Comparisons holders
1197 RETURN
1199 '
1200 'Continuous control loop; resets & reruns sorts automatically -----
1220 CNT = CNT + 1' Number of sorts executed
1222 SHOT = SHOT + 1' Used in default randomization
1224 INIT = 1' Initialize display
1231 FOR Z=1 TO 3: CMP(Z)=0: SWP(Z)=0: NEXT Z' Zero flips/swaps counters
1240 IF SHOT>31121 THEN SHOT=INT(SHOT/5)' Avoid out of range seeds
1245 IF INST >0 THEN GOSUB 49000' Instructions requested
1250 IF TAKESD >0 THEN GOSUB 9200' Take seed if seed toggle on
1275 IF NULENGTH>0 THEN GOSUB 9000' Prompt for new array length
1310 GOSUB 7000' Set up array to be sorted
1330 PRINT CL$;' Clear screen for new run
1340 IF SHOCNT >0 THEN GOSUB 9300' Show count of runs
1350 GOSUB 9400' Display bottom-of-screen legend
1390 X=SBASE : GOSUB 4500' Display "before" array
1399 '
1410 IF QUIK>0 THEN GOSUB 3000' ---SORT!---> Do quicksort
1415 IF FAST>0 THEN GOSUB 3800' ---SORT!---> Fastsort
1420 IF BUBB>0 THEN GOSUB 4000' ---SORT!---> Bubblesort
1421 '
1425 IF BUBB<1 AND FAST<1 AND QUIK<1 THEN GOSUB 6000
1426 ' Remind: Turn a sort on.
1427 IF BUBB<1 AND FAST<1 AND QUIK<1 THEN BUBB=1:FAST=1:QUIK=1
1428 ' If no entry, turn all on.
1430 GOSUB 14100' Freeze display briefly
1440 GOTO 1200' Start again, new seed
1499 '
3000 'QUICKSORT -----
3020 'These lines do the sort These lines display results
3021 'and keep statistics and control sort & display speed
3030 '-----
3031 INIT=1 : INIT2=1 : X=QBASE' display base
3036 POKE X-2, ASC("Q")
3041 WH=1' Which running?

```

More →

Listing continued.

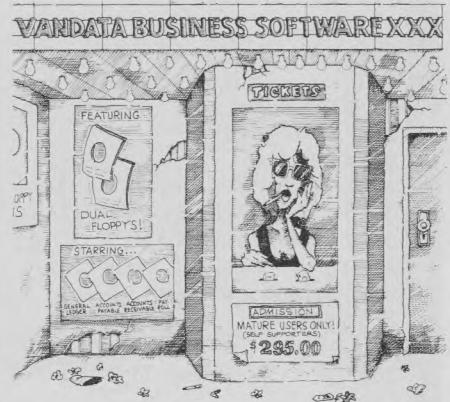
```

3050      '                                10000 Speed & controls
3062      '                                4700 New i & j
3065      '                                4500 & 4600 Current array
3070      '                                V      V      V
3074      '                                GOSUB 4500
3080      '                                IF DSP>0 THEN GOSUB 10000
3100      I1=1 : J1=MAX' TOP
3110      I=I1 : J=J1 : SW = -1
3120      '                                IF DSP>0 THEN GOSUB 4500
3130      '                                IF DSP>0 THEN GOSUB 4700
3140      '                                IF DSP>0 THEN GOSUB 10000
3150      CMP(WH) = CMP(WH)+1
3160      IF S(I) <= S(J) THEN 3220
3170      '                                GOSUB 10000
3180      SWAP S(I), S(J) : SWP(WH) = SWP(WH)+1
3190      '                                IF DSP>0 THEN GOSUB 4600
3200      '                                IF DSP>0 THEN GOSUB 10000
3210      SW = -SW
3220      IF SW>0 THEN I=I+1 ELSE J=J-1
3225      '                                IF DSP>0 THEN GOSUB 4700
3230      '                                IF DSP>0 THEN GOSUB 10000
3250      IF I<J THEN 3150
3260      IF I+1 => J1 THEN 3280
3270      P=P+1 : ST(P,1)=I+1 : ST(P,2)=J1
3280      J1=I-1
3290      '                                IF DSP>0 THEN GOSUB 10000
3300      IF I1<J1 THEN 3110
3310      IF P=0 THEN 3360
3320      I1=ST(P,1) : J1=ST(P,2)
3330      P=P-1
3340      '                                IF DSP>0 THEN GOSUB 10000
3350      GOTO 3110
3360      'Fini!
3370      '                                GOSUB 4500
3390      '                                IF STATS>0 THEN GOSUB 4800' Show stats
3420      RETURN
3440      '----- end of QUICKSORT
3799
3800      'SHELL SORT (FASTSORT) -----
3811      'These lines do the sort
3816      'and keep statistics
3821      '-----
3826      INIT1 : INIT2=1 :
3831      '                                X=FBASE' display base
3836      '                                POKE X-2, ASC("F")
3841      '                                10000 Speed & controls
3846      '                                4700 New i & j
3851      '                                4500 Current array
3856      '                                V      V      V
3861      '                                GOSUB 4500
3866      N = MAX
3871      J4 = N
3876      J4 = INT(J4/2)
3881      IF J4=0 THEN 3976
3886      J2 = N - J4
3891      JJ = 1
3896      I = JJ
3901      '                                IF DSP>0 THEN GOSUB 10000
3906      J = I + J4
3911      '                                IF DSP>0 THEN GOSUB 4700
3916      CMP(WH)=CMP(WH)+1
3921      IF S(I) <= S(J) THEN 3961
3926      '                                IF DSP>0 THEN GOSUB 10000
3931      SWP(WH)=SWP(WH)+1
3936      SWAP S(I), S(J)
3941      '                                IF DSP>0 THEN GOSUB 4600
3946      '                                GOSUB 10000
3951      I = I - J4
3956      IF I => 1 THEN 3901
3961      JJ = JJ + 1
3966      IF JJ > J2 THEN 3876
3971      GOTO 3896
3976      '                                GOSUB 4500
3981      '                                IF STATS>0 THEN GOSUB 4800' Show stats
3986      RETURN
3991      '----- end of FASTSORT
3999
4000      'BUBBLE SORT -----
4020      'These lines do the sort
4021      'and keep statistics
4022      '-----
4023      INIT1:INIT2=1:TOPDISORDER=MAX:
4024      '                                X=BBASE' display base
4032      '                                POKE X-2, ASC("B")
4033      '                                Speed & controls
4034      '                                New i & j
4036      '                                Current array
4038      '                                V      V      V

```

More

FOR MATURE USERS ONLY.



If you're a dealer, OEM, or fairly knowledgeable end user, Vandata has an incredible deal for you — the Vandata Business Software Package. The package includes: General Ledger, Accounts Payable, Accounts Receivable and Payroll with Cost Accounting, plus our custom installation program. **All for only \$295.**

Why so low? Because a mature user doesn't need support. That drastically cuts our costs. And yours.

And if you're a software dealer, you can resell Vandata Business Software without paying royalties. The Vandata business package is the best-debugged, easiest-to-install enhanced Osborne-based system on the market. It's well worth up to \$995 with your support to end users.

Minimum requirements are 48K RAM, CP/M,™ or CDOS, CBASIC2,™ a CRT and a 132-column printer. The package is available on most CP/M disk formats. Our installation manual is included and the Osborne/McGraw-Hill application manuals are available separately.

Why pay for support you don't need? Order the Vandata Business Software Package. **Call toll free: 1-800-426-5248.**

VANDATA

17544 Midvale Ave. N., Suite #107,
Seattle, WA 98133.
In Washington call (206) 542-7611.
Visa or Mastercard accepted.

CHIPS & DALE

4116 200 ns 8/\$12.00 100 + \$1.18 ea.
 4116 150 ns 8/\$13.75 100 + \$1.25 ea.
 2114L 300 ns 8/\$12.00
 2114L 200 ns 8/\$13.00
 4164 200 ns \$5.50 ea 100 + CALL
 4164 150 ns \$5.95 ea 100 + CALL
 6116 150 ns \$5.20 ea 100 + CALL
 6116 200 ns \$4.85 ea 100 + CALL
 6116 LP 150 \$5.85
 1791 Disk Controller \$20.00
 1771 Disk Controller \$16.75
 Z80A CPU \$3.50
 Z80A CTC \$3.50
 Z80A PIO \$4.00
 8251A \$4.00 ea
 8255 \$4.25
 2716-1 (5V) 350 ns 8/\$4.25 ea \$5.00 ea
 2716 (5V) 450 ns \$3.35 ea 100 + CALL
 2732 \$3.85 ea 100 + CALL
 2532 8/\$4.25 \$5.00 ea 100 + CALL
 2764 5V 300 ns 28 pin \$5.95 ea
 2564 \$16.50
 68000 CPU \$CALL
 8087 Intel Co-processor for 8088
 CALL

COMPUTERS

NEC APC Computers.....	CALL	CALL
Altos Computers.....	CALL	CALL
Sage II (16 bit).....	CALL	CALL
IBM P.C. complete sys. (with or w/out hard disk).....	CALL	CALL

IBM PERIPHERALS

Baby Blue board.....	CALL	CALL
Quadram board		
E Quadram II.....	\$275.00	CALL
Davong hard-disk.....	CALL	CALL
Davong board.....	CALL	CALL
Amdek Monitors.....	CALL	CALL
Princeton Monitors.....	\$700.00	CALL
NEC 3550 Printer.....	\$2,297.	CALL
Call for other IBM Peripherals		
NEC Printer P.C. 8023.....	\$695.00	\$465.00
Other NEC Printers.....	—	CALL
Okidata Printers		
82A.....	\$748.00	CALL
83A.....	\$995.00	CALL
84A.....	\$1395.00	CALL

TANDON DRIVES

Tandon 100-2 320K \$240.00
 Shugart Drives SA-455-2 1/2 height 320K . \$255.00

WE REPAIR & FIX DRIVES

Allow up to 3 wks. for personal checks to clear.
 Please include phone number. Price subject to
 change without notice. Shipping & Handling for
 Chips \$3.50. FOB Bellevue, WA for all else. Wash.
 residents add 7.9% Sales Tax.

CHIPS & DALE
 10655 N.E. 4th St., Suite 400
 Bellevue, WA 98004
 1-206-451-9770

Listing continued.

```

4040
4044 TOP=TOPDISORDER:FLAG=0:I=1:J=2
4060 IF DSP>0 THEN GOSUB 4700
4070 IF DSP>0 THEN GOSUB 10000
4080 CMP(WH) = CMP(WH)+1
4090 IF S(I)>S(J) THEN SWAP S(I),S(J):FLAG=1:TOPDISORDER=I:SWP(WH)=SWP(WH)+1
4100 IF DSP>0 THEN GOSUB 4700
4110 GOSUB 10000
4120 IF J=>TOP THEN IF FLAG=0 THEN 4180 ELSE TOP=TOPDISORDER : GOTO 4044
4130 IF DSP>0 THEN GOSUB 10000
4140 I=I+1 : J=J+1
4150 IF DSP>0 THEN GOSUB 4700
4160 IF DSP>0 THEN GOSUB 10000
4170
4180 GOTO 4080
4190 GOSUB 4500
4200 IF DSP>0 THEN GOSUB 10000
4210 IF STATS>0 THEN GOSUB 4800
4220
4230 RETURN
4240 '----- end of BUBBLE SORT
4499
'Display current sort ..... at xBASE location .....
4510 IF INIT=1 THEN FOR W=1 TO MAX : S(W)=B(W) : NEXT W : INIT=0
4520 FOR W=1 TO MAX
4530 IF WH=1 THEN IF I<J1 THEN IF W=I1 THEN V=128' Rev video zone
4540 POKE X+W, V+S(W)' Show in posit
4550 IF WH=1 THEN IF W=J1 THEN V=0' Cx1 rev video
4560 NEXT W
4570 V=0' Cx1 rev video
4590 RETURN
4599
'Display only the change in sort array .....
4600 POKE X+I, S(I)+128
4610 POKE X+J, S(J)+128
4620
4630 RETURN
4640
'Display the current i & j. Erase old & put in new if different . * .
4700 IF INIT2=1 THEN INIT2=0 : GOTO 4728' avoid LJ & LI display
4710 IF I<>LI THEN POKE 40+X+LI, 32' erase old pointers
4720 IF J<>LJ THEN POKE 40+X+LJ, 32
4722 IF WH>1 THEN IF I<>LI THEN POKE X+LI, S(LI)' use for F&B only WH>1
4723 IF WH>1 THEN IF J<>LJ THEN POKE X+LJ, S(LJ)
4728 IF WH>1 THEN POKE X+I, S(I)+128
4729 IF WH>1 THEN POKE X+J, S(J)+128
4730 POKE 40+X+I, 94' as markers
4740 POKE 40+X+J, 94
4750 IF I = J THEN POKE 40+X+I, ASC(" ")' Subgroup sorted
4760 LI=I : LJ=J' Keep track for erasure
4770 RETURN
4780
'Display stats after a sort run (STATS toggle on) ..... * .....
4800 PRINT PO$+CHR$(39+WH)+CHR$(55); : PRINT USING F$; CMP(WH)
4810 PRINT PO$+CHR$(39+WH)+CHR$(62); : PRINT USING F$; SWP(WH);
4820 ' (55/62) positions cursor for approp column
4822 ' (39+WH) positions cursor for appropriate line
4830 GOSUB 14000' return cursor to position to post speed
4840 RETURN
4849
'Display only the change in bubble sort array ..... * .....
5000 POKE X+I, 128+V+S(I)' Ith displayed reverse video
5010 POKE X+J, 128+V+S(J)' Jth displayed reverse video
5020 RETURN
5030
5040
5060 'If all 3 sorts off, inform about CANCEL and request selection;
5070 ' if none made, time out and activate all
5080 GOSUB 54000' Cancel information
5090 GOSUB 49400' Allow reading time, wait for T$
5100 IF T$="I" THEN GOSUB 49000' Instructions subroutine
5110 IF T$="B" THEN BUBB=1' Turn on Bubbler
5120 IF T$="Q" THEN QUIK=1' Quicksort
5130 IF T$="F" THEN FAST=1' Fastsort
5140 RETURN
5150
5160 'Set up random string to be sorted .....
5170 'Next line allows randomizing to R$ (keyboard entry) for repeatability,
5180 ' but if none, randomizes on SHOT value, roughly a count of runs
5190 IF R$<>" " THEN RANDOMIZE ASC(R$) ELSE RANDOMIZE SHOT
5200 R$= " " Zero R$ so 7020 won't be invoked next time
5210 FOR MM=1 TO 3 : SWP(MM)=0 : CMP(MM)=0 : NEXT MM 'zero swaps/comps cnts
5220 FOR M = 1 TO MAX
5230 B(M)=INT(65+(RND*57))' "Before" array
5240 NEXT M
5250 RETURN
5260
5270 'Allow time to enter new length but time out if none entered .....
5280 LONG$="" Will carry the new array length as a 1 or 2-digit nmbr
5290 NULENGTH=0' Zero the flag; each length-change requested individ'ly
5300

```

More



LAST NIGHT, 39 MUSICIANS HAD A COMPUERVE CONFERENCE, SO DID 31 M.D.S, 49 SPORTS FANS AND 640 APPLE POLISHERS, AND NO ONE HAD TO LEAVE HOME.

The Electronic Forum, Cheaper than Long Distance and Much More Rewarding.

Every night on the CompuServe Information Service, professional and social groups discuss a wide range of subjects. From what's new in medical technology to what's nouvelle in continental cuisine.

And every day more computer owners who share a common interest are discovering this exciting new way to exchange ideas and even transfer hard copy data.

And besides electronic forums, they leave messages for each other on our national bulletin board, "talk" informally on our CB simulator, and communicate via CompuServe's electronic mail.

But best of all, in most cases, CompuServe subscribers get all of these state of the art communications options, plus a world of on-line information and entertainment for the cost of a local phone call plus connect time.

To become part of this flexible communications network, all you

need is a computer, a modem and CompuServe. CompuServe connects with almost any personal computer, terminal, or communicating word processor.

To receive an illustrated guide to CompuServe and learn how you can subscribe, contact or call:

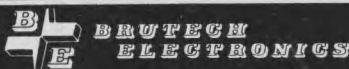
CompuServe

Consumer Information Service, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, OH 43220

800-848-8199

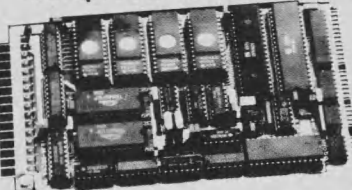
In Ohio call 614-457-0802

An H&R Block Company



B.E.M. SBC5A/B 6502

Single Board Computers with Multi-Speed and Multiprocessor features.



A map-controlled clock circuit gives the BEM-SBCA/B a handy twist-two speed operation that can be changed instantly in response to a processing task. Both computers have one USART (2651) and one VIA (6522). Memory capacity will be for the SBC5A 2-16K byte RAM and 4 64K byte EPROM and for the SBC5B 2-40K byte RAM and 4-16K byte EPROM. Multiprocessor features are optional for both cards. Fully buffered and decoded. Fully expandable, but also suitable for stand alone applications. Price **\$259.00** in standard version (2K byte RAM, 1MHz)

The B.E.M. Modular Eurocard Program consists of a wide range of Microprocessor application cards like:

- * Single Board Computers with 6502 or 6809 CPU
- * Universal Eprom Programmer Board for most 5V EPROM'S from 1Kx8 up to 16Kx8 including some EEPROM'S \$198.00
- * Add-On Data Acquisition Modules, plug directly in socket of free VIA (6522) or PIA (6520), gives the user 16 analog channels of 10-bit resolution \$69.00
- * Above mentioned module also available with two additional 8-bit DAC's (AD588) \$145.00
- * Add-On Real Time Clock Modules, plug directly in socket of free VIA (6522), with battery back-up \$79.00

Also available:

- * Static Ram Cards
- * Dynamic Ram Cards
- * CMOS RAM Cards
- * Combination Cards (EPROM/RAM)
- * Various I/O Cards
- * Serial/Parallel Cards
- * Controller Cards for Floppy Disk Drives and Digital Data Recorders
- * Video Controller Card
- * High Resolution Graphic System Cards
- * A/D and D/A Converter Cards
- * 6502 and 6809 Development Systems

For more information: call or write



K & P Microsystems
RD #6, Box 219-G
Greensburg, PA 15601 (412) 838-9793

```

9040 PRINT CL$+DN6$+ " New length? "
9045 PRINT " Maximum: "; TOPMAX; " ";
9050 FOR TIMER=1 TO 3500' Allow 3500 counts
9052 X$ = INKEY$' for a keypress
9054 IF X$<>" " THEN 9080
9060 NEXT TIMER
9070 GOTO 9130' Takes over if timed out
9075 ' If a non-number is entered, ascii value is taken as length;
9080 IF X$="9" THEN MAX=ASC(X$) : GOTO 9140' example: ESC (asc 27)
9090 IF X$<"0" THEN MAX=ASC(X$) : GOTO 9140' or TAB (asc 9)
9100 PRINT X$;' Echo numbers
9110 LONG$=LONG$+X$' Concatenate length
9120 IF LEN(LONG$) > 1 THEN MAX=VAL(LONG$) ELSE 9050'Wait for 2nd keypress
9130 IF LONG$<>" " THEN MAX = VAL(LONG$)' Time-out target line;
9135 ' captures 1-digit size
9140 IF MAX < MINMAX THEN MAX=TOPMAX' Disallow tiny array
9150 IF MAX > TOPMAX THEN MAX=TOPMAX' Disallow oversize array
9160 RETURN
9199 '
9200 'Take seed: Allow time for entry but time out if no entry made .....
9260 PRINT HO$+CE$+" "RV$+"Seed"+RV$+"?"+"BS$;" Prompt for seed
9270 FOR R=1 TO 3500' Pause loop for seed entry
9280 R$=INKEY$' Seed is any keypress
9290 IF R$<>" " THEN 9297' Return with seed as R$
9291 NEXT R
9297 RETURN
9299 '
9300 'Display count of runs .....
9310 PRINT HO$+CE$+" "STR$(CNT);;' Show run number
9311 'Blanks between quotes above are tabs -- enough to reach center screen
9397 RETURN
9399 '
9400 'Set up screen to receive new sort array; show legend at bottom .....
9410 PRINT:PRINT HO$+DN7$;: IF STATS<1 THEN PRINT : GOTO 9417
9414 'Matrix for comps/swaps report is shown only if X option is on.
9415 PRINT " Comps Swaps"
9417 PRINT " Key I for";
9418 IF STATS>0 THEN PRINT " Q" ELSE PRINT
9419 PRINT " instructions";
9420 IF STATS>0 THEN PRINT " F" ELSE PRINT
9421 IF STATS>0 THEN PRINT " B" ELSE PRINT
9485 PRINT " Number keys control speed: "+SP$+BS$;
9489 'Above line, with SP$+BS$, positions cursor to show speed
9497 RETURN
9499 '
10000 'SPEED CONTROL affects speed between display updates .....
10010 GOSUB 11000' Minimum of 1 check for controlling keys
10020 IF SPEED=1 THEN 10060' Fastest; immediate return
10030 FOR SLOW=1 TO SPEED*10' Delay loop
10040 GOSUB 11000' Check for controlling keystrokes
10050 NEXT SLOW
10060 RETURN
10070 '
11000 'Controls filter: Pause, Sorts, Display, Stats, Seeds on/off, etc....
11010 T$=INKEY$' Check keyboard
11020 IF T$="" THEN 11147' If no key, rtn
11030 IF T$<"9" THEN IF T$>"0" THEN GOSUB 12000:GOTO 11147' Number handler
11040 IF ASC(T$)>90 THEN T$=CHR$(ASC(T$)-32)' Make upper case
11050 IF T$="D" THEN DSP = -DSP : GOTO 11147' Display on/off
11060 IF T$="X" THEN STATS = -STATS : GOTO 11147' Stats on/off
11070 IF T$="N" THEN SHOCNT = -SHOCNT : GOTO 11147' Count on/off
11080 IF T$="B" THEN BUBB=1 : GOTO 11147' Bubbler on
11090 IF T$="Q" THEN QUIK=1 : GOTO 11147' Quiksort on
11095 IF T$="F" THEN FAST=1 : GOTO 11147' Fastsort on
11100 IF T$="A" THEN BUBB= 1: QUIK= 1: FAST= 1: GOTO 11147' All on
11105 IF T$="C" THEN BUBB=-1: QUIK=-1: FAST=-1: GOTO 11147' All cancel
11110 IF T$="S" THEN TAKESD = -TAKESD : GOTO 11147' Request seed
11112 'Next line is structured to post the "P" for pause, then
11113 ' pause (subr13000), then repost speed by using line 12120 as a
11114 ' subroutine, then recycle to 11030 to see if the key pressed for
11115 ' pause release was also a control key.
11120 IF T$="P" THEN PRINT T$+BS$;:GOSUB 13000:GOSUB 12120:GOTO 11030' Pause
11130 IF T$="L" THEN NULENGTH = 1 : GOTO 11147' Change length
11135 IF T$="I" THEN INST = 1 : GOTO 11147' Show instrux
11140 IF T$="!" THEN PRINT CL$ : GOSUB 14200 : GOTO 65000' Quitting
11147 RETURN
11999 '
12000 'Check for speed change .....
12010 IF T$="0" THEN SPEED= 22' Dead slow (Use P to pause completely)
12020 IF T$="1" THEN SPEED= 16' Very slow
12030 IF T$="2" THEN SPEED= 13'
12040 IF T$="3" THEN SPEED= 10'
12050 IF T$="4" THEN SPEED= 7' Medium speed
12060 IF T$="5" THEN SPEED= 5'
12070 IF T$="6" THEN SPEED= 4'
12080 IF T$="7" THEN SPEED= 3'
12090 IF T$="8" THEN SPEED= 2' Fast
12100 IF T$="9" THEN SPEED= 1' No delay (default)
12110 SP$=T$

```

More

Listing continued.

```

12112 'When the following line is reached, the cursor has already been pre-
12113 ' positioned over the speed indicator; it prints the (new?) speed
12114 ' and backspaces to restore the same position.
12120 PRINT SP$+BS$;
12137 RETURN
12140 '
13000 'Pause loop holds until any key is pressed .....
13010 T$=INKEY$' Using T$ allows use of a control key to
13020 IF T$="" THEN 13010' terminate pause & then be acted upon.
13030 RETURN' See notes on T$="P" in controls section.
13040 '
14000 'Return cursor to the speed-posting position .....
14010 PRINT : PRINT HO$;
14020 'On above line, the PRINT is necessary to prevent MBASIC from issuing
14030 ' an unwanted carriage-return-linefeed at a bad moment.
14040 FOR DN=1 TO 11 : PRINT DN$; : NEXT DN' Jump down
14052 PRINT RET$+ " Number keys control speed: "+SP$+BS$;
14055 'Above line overwrites "Key I for instructions" line, positions cursor
14060 RETURN
14070 '
14100 'Pause to view finished sort; check for control keys .....
14110 FOR SLEEP=1 TO 1400 : GOSUB 11000 : NEXT SLEEP : RETURN
14130 '
14200 'Toggle display to 12x40 or 24x80; clears screen coming and going *
14210 PRINT CL$+LP$+CP$+CL$; : RETURN
14220 '
15000 'Cursor control strings for IMSAI VIO-C ..... * .....
15010 UP$=CHR$(11)' Cursor UP 1 line, stays in same column.
15020 DN$=CHR$(10)' Cursor Down 1 line, stays in same column.
15025 LF$=DN$' (Same. LineFeed designation.)
15030 DN4$=DN$+DN$+DN$+DN$' Go down 4 lines
15040 DN6$=DN4$+DN$+DN$' 6
15045 DN7$=DN6$+DN$' 7
15080 CE$=CHR$(8)' Clear from cursor to End of current line.
15090 BS$=CHR$(8)' Backspace.
15100 HO$=CHR$(30)' Cursor Home (uppermost, leftmost), no clear.
15110 CL$=CHR$(26)' Clear screen, cursor home.
15120 LP$=CHR$(27)+CHR$(76)' Lines per Page toggle (12/24)
15130 CP$=CHR$(27)+CHR$(67)' Characters Per line toggle (40/80)
15140 RV$=CHR$(22)' Reverse video toggle.
15145 RET$=CHR$(13)' Carriage return (no line feed)
15146 PO$=CHR$(27)+CHR$(61)' Cursor positioner
15150 RETURN
15160 '
39000 'Instructions, with hit-any-key bailout, but timed bailout, too .. *..
39010 PRINT CL$' Below, RV$ toggles reverse video on/off
39020 PRINT " "+RV$+"SORT"+RV$+"DEMO"
39030 PRINT
39040 PRINT " This program visualizes 3 sort"
39050 PRINT " algorithms, the "+RV$+"bubble sort"+RV$+", the"
39060 PRINT " "+RV$+"quicksort"+RV$+", and the "+RV$+"fastsort"+RV$+", "
39065 PRINT " and allows comparison."
39070 PRINT
39080 PRINT " The program will run unattended or"
39090 PRINT " will allow user control."
39100 PRINT
39110 PRINT " Hit any key for instructions.";
39130 GOSUB 41000' Pause
39135 PRINT CL$;
39140 PRINT " These are the control keys:"
39150 PRINT " QFB - Select each sort"
39170 PRINT " A - All running"
39175 PRINT " C - Cancel all & reselect"
39180 PRINT " D - Display of sort process on/off"
39190 PRINT " P - Pause (any key cancels)"
39200 PRINT " X - Swaps/comparisons report on/off"
39210 PRINT " L - To change sort-array size"
39220 PRINT " S - Seed randomizer (any key)"
39230 PRINT " 0-9 - Numbers control speed"
39235 PRINT " ! - Terminates operation"
39240 PRINT " "+RV$+"To start, hit any key."+RV$;
39250 GOSUB 41000' Pause
39270 RETURN
39280 '
41000 'Pause for instruction reading .....
41010 FOR SLEEP=1 TO 4500' Allow 4500 counts for reading,
41020 SLEEP$=""' timing out if no response
41030 SLEEP$=INKEY$
41040 IF SLEEP$<>"" THEN 41070' Hit-any-key bailout
41050 NEXT SLEEP
41070 RETURN
41080 '
49000 'Show main instruction screen, then screen for specific requests
49011 INST=0 : GOSUB 50000 : GOTO 49151' Main instrux
49016 IF T$="" THEN 49141' Screen timed out
49021 IF ASC(T$)>90 THEN T$=CHR$(ASC(T$)-32)' Make upper case
49026 IF T$=LAST$ THEN 49141' If a repeat, return instead
49028 LAST$=T$' Keep track for next time 'round

```

(More)

Price Shopping?

Diskettes	SS/SD	List	Sale
ELEPHANT		\$40.00	\$ 18.95
WORDSWORTH		40.00	23.95
	SS/DD		
ELEPHANT		45.00	21.95
WORDSWORTH		45.00	25.95
MAXELL		55.00	27.95
IBM		59.95	27.95
VERBATIM		49.94	27.95
	DS/DD		
ELEPHANT		55.00	27.95
WORDSWORTH		55.00	29.95
IBM		69.96	37.95
MAXELL		78.50	39.95
VERBATIM		71.50	39.95

Hardware

FLIP-N-FILE	\$ 29.95	\$ 19.95
LIBRARY BOX	4.95	2.25
HEAD CLEANING KIT	30.00	19.95
AMDEK 300 grn mon.	199.00	139.95
AMDEK 300a amb mon.	210.00	149.95
PROWRITER 10" par.	595.00	379.95
GORILLA Banana printer	249.95	229.00
TYMAC par print crd, Apple	139.00	79.00
TYMAC par tackler crd, Apple	159.00	99.00
SAMSON 256k crd ser pt. IBM	559.00	395.00

MUCH MORE - send for complete disk/hardware list!


corona
 The Compatible Company

AT SIMILAR SAVINGS

USE Electronics

 103 GODWIN AVENUE
 MIDLAND PARK NJ 07432

TERMS: MO, certified check. Allow time for other checks to clear. NJ res. add 6% tax. S&H to 48 states add \$3. Monitors \$10. Printers \$15. COD add \$3 to S&H. Outside US. Inquire.

Circle 115 on Reader Service card.

NOW: SIX TIMES PER YEAR! COMPUTERS 84

RATE BASE:

130,000

ISSUE DATES:

- Nov./Dec. • May/June
- Jan./Feb. • July/Aug.
- Mar./Apr. • Sept./Oct.

The complete publication for the beginner or inexperienced computer owner. Targeted to reach the impressive computer market of the future... people who are planning to buy... or owners of hardware ready to upgrade. Computers 84 talks to them in plain language, explaining your products and suggesting applications.

For further information, contact:

 Ed Knobloch, Advertising Director
 1515 Broadway, New York, NY 10036
 212-719-6572
A CBS PUBLICATION

Microcomputing, November 1983 91

DATA COMPACTOR

**Increase data storage capacity
1/3 to 100% without using
machine-code!**

These routines are written in BASIC SOURCE CODE which may be integrated into user's programs in direct sequence or as subroutines. This manual will show you how to do it yourself.
Send \$49.95 & \$2.00 USA shipping
Demo disks available with mergeable routines for CP/M or TRSDOS compatible routines for TRS-80, II, or III.
Specify CPM or TRSDOS & add \$19.95 for 5 1/4" disk or \$24.95 for 8" disk.

**Dealers Invited**

EDWARDS & ASSOCIATES
P.O. BOX 42158
COLUMBIA, S.C. 29240

**this publication
is available in
microform**

**University Microfilms International**

300 North Zeeb Road
Dept. P.R.
Ann Arbor, MI 48106
U.S.A.

18 Bedford Row
Dept. P.R.
London, WC1R 4EJ
England

Circle 342 on Reader Service card.

**Grandma's
Software****Vic
20**

CLUBLIST: Granny uses this program to keep track of her quilting club. Records names etc., dues expiration; prints out roster. 8K Version up to 25 members, 16K Version 90. \$11.95

MATH DRILL: This one is so all the younguns can practice their ciphers. 3 levels of difficulty on all four arithmetic operations. \$9.95

MORSE CODE: Drills user in code recognition \$9.95

AMORTPRINT: Compute payment amount & print an amortization table. \$9.95

If you want a program list or have a dandy program for sale write to Grandma's.

Grandma's Software
Box 1105
San Bernardino, California 92402

California folks please add 6% for sales tax.

Listing continued.

```

49031 IF T$="I" THEN GOSUB 50000 : GOTO 49151' instrux
49041 IF T$>"O" THEN IF T$<="G" THEN GOSUB 51000 : GOTO 49151' speed
49051 IF T$="Q" THEN GOSUB 52000 : GOTO 49151' quiksort
49061 IF T$="B" THEN GOSUB 52400 : GOTO 49151' bubbler
49063 IF T$="F" THEN GOSUB 52700 : GOTO 49151' fastsort
49066 IF T$="N" THEN GOSUB 53000 : GOTO 49151' run no.
49071 IF T$="A" THEN GOSUB 54500 : GOTO 49151' all run
49076 IF T$="C" THEN GOSUB 54000 : GOTO 49151' cxl
49081 IF T$="D" THEN GOSUB 55000 : GOTO 49151' display
49091 IF T$="P" THEN GOSUB 56000 : GOTO 49151' pause
49101 IF T$="X" THEN GOSUB 57000 : GOTO 49151' stats
49111 IF T$="L" THEN GOSUB 58000 : GOTO 49151' length
49121 IF T$="S" THEN GOSUB 59000 : GOTO 49151' seed
49131 IF T$="!" THEN GOSUB 60000 : GOTO 49151' quit
49141 LAST$="":T$="":PRINT CL$:RETURN' Rtn if all tests fail
49151 GOSUB 49400' Delay
49161 GOTO 49016' Screen new T$
49171 '
49181 '
49191 '
49201 'Pause for screen reading .....
49211 FOR SLEEP=1 TO 7500' Allow 7500 counts for reading,
49221 T$=""' timing out if no response
49231 T$=INKEY$
49241 IF T$<>"" THEN 49597' Hit-any-key bailout
49251 NEXT SLEEP
49261 RETURN
49271 '
49281 'This text used in several screens so is made a subroutine.
49291 PRINT
49301 PRINT "Key "+RV$+"I"+RV$+" to return to instructions or"
49311 PRINT " "+RV$+"R "+RV$+" to return to operation."+RET$+" ";
49321 RETURN
49331 '
49341 'Main instruction screen. TEXT:
49351 '
49361 'Hit any for more about its effect:
49371 ' A - All running
49381 ' QFB - Select each sort
49391 ' C - Cancel & reselect
49401 ' D - Display of sort process on/off
49411 ' P - Pause (any key cancels)
49421 ' X - Swaps/comparisons report on/off
49431 ' L - To change sort-array size
49441 ' S - Seed randomizer on/off
49451 ' N - Run counter on/off
49461 ' SP$- Numbers 0-9 control speed
49471 ' ! - terminates operation";
49481 '
49491 PRINT CL$;
49501 PRINT " Hit "+RV$+"key"+RV$+" for explanation of function:"
49511 PRINT " "+RV$+"A"+RV$+" - All sorts running"
49521 PRINT " "+RV$+"QFB"+RV$+" - To select Q/F/B sorts"
49531 PRINT " "+RV$+"C"+RV$+" - Cancel & reselect"
49541 PRINT " "+RV$+"D"+RV$+" - Display of sort process ";
49551 IF DSP>0 THEN PRINT RV$;
49561 PRINT "on";
49571 IF DSP>0 THEN PRINT RV$;
49581 PRINT "/";
49591 IF DSP<0 THEN PRINT RV$;
49601 PRINT "off"
49611 IF DSP<0 THEN PRINT RV$;
49621 PRINT " "+RV$+"P"+RV$+" - Pause (any key cancels)"
49631 PRINT " "+RV$+"X"+RV$+" - Swaps/comparisons report ";
49641 IF STATS>0 THEN PRINT RV$;
49651 PRINT "on";
49661 IF STATS>0 THEN PRINT RV$;
49671 PRINT "/";
49681 IF STATS<0 THEN PRINT RV$;
49691 PRINT "off"
49701 IF STATS<0 THEN PRINT RV$;
49711 PRINT " "+RV$+"L"+RV$+" - To change sort-array size"
49721 PRINT " "+RV$+"S"+RV$+" - Seed randomizer ";
49731 IF TAKESD>0 THEN PRINT RV$;
49741 PRINT "on";
49751 IF TAKESD>0 THEN PRINT RV$;
49761 PRINT "/";
49771 IF TAKESD<0 THEN PRINT RV$;
49781 PRINT "off"
49791 IF TAKESD<0 THEN PRINT RV$;
49801 PRINT " "+RV$+"N"+RV$+" - Run number ";
49811 IF SHOCNT>0 THEN PRINT RV$;
49821 PRINT "on";
49831 IF SHOCNT>0 THEN PRINT RV$;
49841 PRINT "/";
49851 IF SHOCNT<0 THEN PRINT RV$;
49861 PRINT "off"
49871 IF SHOCNT<0 THEN PRINT RV$;
49881 PRINT " "+RV$+"SP$"+RV$+" - Numbers 0-9 control speed"
49891 PRINT " ! - terminates operation"+RET$+" ";

```

More

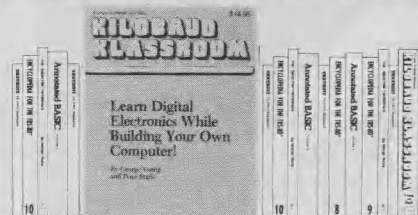
WAYNE GREEN BOOKS

KILOBAUD KLASROOM

by George Young and Peter Stark

Makes learning electronics fun and easy. First published as a series in *Kilobaud Microcomputing*, the book combines the learning of essential theory with practical, hands-on experience. The course begins with basic electronic projects and culminates in the construction of your own programmable microcomputer. The direct instructional methods of authors Young & Stark make KILBAUD KLASROOM a simple way for you to acquire a solid background in digital electronics.

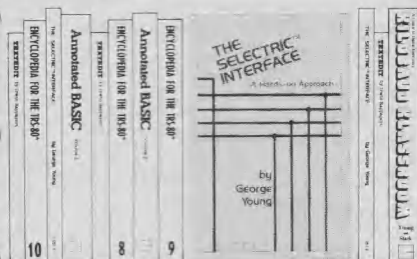
BK7386 (419 pages).....\$14.95



THE SELECTRIC INTERFACE by George Young

You need the quality print that a daisy wheel printer provides but the thought of buying one makes your wallet wilt. The SELECTRIC™ INTERFACE, a step-by-step guide to interfacing an IBM Selectric I/O Writer to your microcomputer, will give you that quality at a fraction of the price. George Young, co-author of *Kilobaud Microcomputing* magazine's popular "Kilobaud Classroom" series, offers a low-cost alternative to buying a daisy wheel printer. The SELECTRIC INTERFACE includes: step-by-step instructions, tips on purchasing a used Selectric, information on various Selectric models, including the 2740, 2980, and Dura 1041, driver software for Z80, 8080, and 6502 chips, tips on interfacing techniques. With The SELECTRIC INTERFACE and some background in electronics, you can have a high-quality, low-cost, letter-quality printer. Petals not included.

BK7388 (125 pages).....\$12.97



TEXTEDIT

A Complete Word Processing System in Kit Form

by Irwin Rappaport

TEXTEDIT is an inexpensive word processor that can be adapted to suit your differing needs—from form letters to lengthy texts. Written in TRS-80 Disk BASIC, the system consists of several modules, permitting the loading and use of only those portions needed. A disk is also available which provides the direct loading of the modules, however, the book is required for documentation. For Model I and III with TRSDOS CONVERT., one disk drive (2 disk drives or copy utility needed to transfer to system disk). Runs under TRSDOS 2.2/2.3. May not function under other systems.

BK7387 (book, 90 pages).....\$9.97

DS7387 (disk).....\$19.97

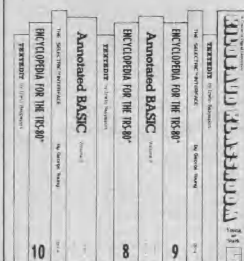
Disk is manufactured by Instant Software, a division of Wayne Green Inc.

TEXTEDIT

a complete wordprocessing system in kit form.

by Irwin Rappaport

A WAYNE GREEN PUBLICATION



ANNOTATED BASIC

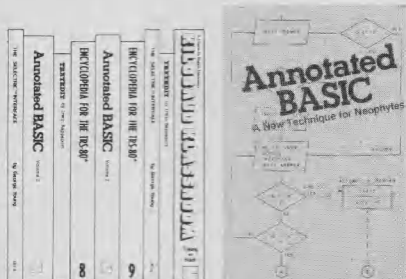
A New Technique for Neophytes

Put your BASIC knowledge to work for you with this 2-volume set of TRS-80 Level II BASIC programs. Gain a better understanding of the elements and techniques involved in programming. ANNOTATED BASIC'S uniquely designed format breaks each program down for you to include: initial documentation and instruction, definitions of New BASIC Concepts, flowchart, annotations of sections, showing how each part fits into the whole, and explaining why certain BASIC commands are chosen over similar ones.

Using the programs as they are or modifying them to sharpen your programming skills, ANNOTATED BASIC is a helpful tool for any BASIC programmer.

BK7384 (Vol. 1, 152 pages).....\$10.95

BK7385 (Vol. 2, 136 pages).....\$10.95

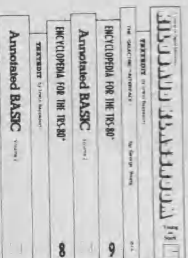


COMPUTER CARNIVAL by Richard Ramella

Your child can become a crackerjack computerist with the sixty TRS-80 Level II programs in COMPUTER CARNIVAL. This large-type, spiral bound book for beginners is a veritable funhouse of games, graphics, quizzes and puzzles. Written by 80 *Micro* columnist Richard Ramella, the programs are challenging enough to ensure continued learning, yet short enough to provide your child with the immediate delight and reward of mastering basic computing skills. And for even greater enjoyment, get the CARNIVAL COMPANION, a 30-minute cassette containing all the programs in the book. Eliminates tiresome typing and lets your child spend more time enjoying the programs.

BK7389 Book (218 pages).....\$16.97

CC7389 Book & Cassette "Carnival Companion".....\$24.97



FOR TOLL-FREE ORDERING CALL 1-800-258-5473 WAYNE GREEN BOOKS•PETERBOROUGH NH 03458

Itemize your order on a separate piece of paper and mail to Wayne Green Books, Attn: Sales, Peterborough, NH 03458. Be sure to include check or detailed credit card information. (Visa, MC or AMEX accepted.) No C.O.D. orders accepted. All orders add \$1.50 for the first book, postage and handling; \$1.00 each additional book; \$10.00 per book foreign air mail. Please allow 4-6 weeks after publication for delivery. Questions regarding your order? Please write to Customer Service at the above address.

CompuCover



COVER YOUR INVESTMENT

- Static Free
- Cloth Backed Vinyl
- Custom Fitted
- Clear Plastic

WE COVER ALL SYSTEMS
FROM ADDS TO ZENITH

1-800-874-6391

ORDER LINE
Dealer Inquiries Invited

CompuCover
P.O. Box 324 Dept. A
Mary Esther, FL 32569

Customer
Service
(904) 243-5793
Telex 469783

CALL TOLL FREE

Circle 120 on Reader Service card.

Apple IIe System for both business and personal



List Price
\$2805

System Includes:

- Apple IIe 64K Computer
- Apple Monitor Stand
- Apple 1st Disk Drive
- Apple Controller Card
- Apple 80 Column Card
- Apple III Monitor for Word Processing
- Apple Tutorial Diskette

Only **\$2077**

**Computer
Discount
of America**

15 Marshall Hill Road
West Milford Mall
West Milford, NJ
07480-2198
In New Jersey call
201-728-8080

ORDER TOLL FREE: 800-526-5313

Circle 36 on Reader Service card.

**SLICK PAGES?
NO!
GREAT DEALS?
YES!**



Computer Shopper pages aren't slick because they were designed for one purpose: to put buyers in touch with sellers at the lowest possible cost. This resulted in bargains on new and used equipment and software.

Individuals nationwide are able to list their pre-owned items for only a few dollars. This created hundreds of classified ads in over 100 big 11x14 pages.

And to make sure there were enough buyers for advertisers, the subscription price was set low, too!

So strike your first deal by taking advantage of the low subscription price, 12 issues for \$15. That's a \$8.40 discount off the newsstand price. Money back guarantee. For faster service (MasterCard and VISA) Call 305-269-3211.

COMPUTER SHOPPER
407 S. Washington Ave. • P.O. Box F570
Titusville, FL 32781

Listing continued.

```

50641
50651
53122
53181
54000
54021 PRINT CL$;
54031 PRINT " "+RV$+"C"+RV$+" cancels"
54041 PRINT " all 3 sorts; you must then reselect."
54051 PRINT
54061 PRINT "Select "+RV$+"Q"+RV$+"uicksort by keying "+RV$+"Q"+RV$+","
54071 PRINT RV$+"F"+RV$+"astsort by keying "+RV$+"F"+RV$
54076 PRINT "and/or "+RV$+"B"+RV$+"ubble sort by keying "+RV$+"B"+RV$+","
54078 PRINT
54101 PRINT "Keying "+RV$+"A"+RV$+" turns on all"
54111 PRINT "three sort methods."
54112 GOSUB 49600 : RETURN
54181
51000
51021 PRINT CL$;
51031 PRINT
51041 PRINT " Numbers "+RV$+"0"+RV$+" to "+RV$+"9"+RV$
51051 PRINT " control the speed of operation."
51061 PRINT
51071 PRINT " The fastest is "+RV$+"9"+RV$;
51081 PRINT " , the slowest "+RV$+"0"+RV$+","
51086 PRINT " Current speed is "+RV$+"SP"+RV$+","
51091 PRINT
51101 PRINT "For operation slower than speed "+RV$+"0"+RV$+"," use"
51111 PRINT "the "+RV$+"P"+RV$+" option to pause the sort."
51121 GOSUB 49600 : RETURN
51181
52000
52011 PRINT CL$;
52021 PRINT " "+RV$+"Q"+RV$
52031 PRINT " turns "+RV$+"Q"+RV$+"uicksort on."
52036 PRINT " It is now ";
52037 IF QUIK>0 THEN PRINT "on." ELSE PRINT "off."
52038 GOSUB 52200
52102 GOSUB 49600 : RETURN
52121
52200 'This segment of text used 3 times so is made a subroutine
52241 PRINT
52251 PRINT " To turn it off, you must key "+RV$+"C"+RV$
52261 PRINT " to cancel all sorts, and then select"
52271 PRINT " those you wish to run."
52291 PRINT " "+RV$+"A"+RV$+"ll can be turned on"
52292 PRINT " by keying "+RV$+"A"+RV$+","
52297 RETURN
52299
52400
52411
52416 PRINT CL$;
52421 PRINT " "+RV$+"B"+RV$
52431 PRINT " turns the "+RV$+"B"+RV$+"ubble sort on."
52436 PRINT " It is now ";
52437 IF BUBB>0 THEN PRINT "on." ELSE PRINT "off."
52447 GOSUB 52200
52502 GOSUB 49600 : RETURN
52521
52700
52711
52716 PRINT CL$;
52721 PRINT " "+RV$+"F"+RV$
52731 PRINT " turns "+RV$+"F"+RV$+"astsort on."
52736 PRINT " It is now ";
52737 IF FAST>0 THEN PRINT "on." ELSE PRINT "off."
52738 GOSUB 52200
52802 GOSUB 49600 : RETURN
52821
53000
53021 PRINT CL$;
53031 PRINT " "+RV$+"N"+RV$+" turns"
53041 PRINT " run number on/off"
53046 PRINT " Next run: "; CNT+1
53051 PRINT
53061 PRINT "This is a simple count of sort runs."
53091 PRINT
53101 PRINT "Keying "+RV$+"X"+RV$+" turns on a report of "
53111 PRINT "how many comparisons & swaps were made"
53121 PRINT "to put the array in order in each case."
54500
54511 PRINT CL$;
54516 PRINT
54521 PRINT " "+RV$+"A"+RV$
54531 PRINT " turns on all three sorts."
54533 PRINT " Currently on: ";
54534 IF QUIK>0 THEN PRINT "Q ";
54535 IF FAST>0 THEN PRINT "F ";
54536 IF BUBB>0 THEN PRINT "B ";

```

More

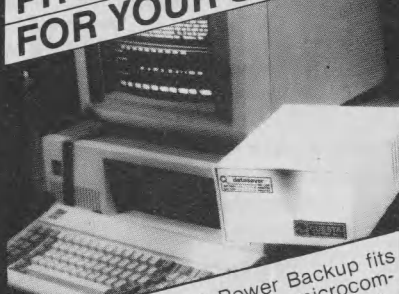
Listing continued.

```

54537 IF QUIK<0 AND FAST<0 AND BUBB<0 THEN PRINT "None";
54539 PRINT
54541 PRINT
54551 PRINT " To turn any off, you must key "+RV$+"C"+RV$+ "."
54561 PRINT " to cancel all, and then select"
54571 PRINT " those you wish to run."
54572 GOSUB 49600 : RETURN
54599 '
55000 ' D display
55021 PRINT CL$;
55031 PRINT " "+RV$+"D"+RV$
55041 PRINT "turns "+RV$+"D"+RV$+"isplay of sort on or off."
55046 PRINT "It is now ";
55047 IF DSP>0 THEN PRINT "on." ELSE PRINT "off."
55051 PRINT
55061 PRINT "The sort will run faster with the"
55071 PRINT "display off, but its speed may still be"
55081 PRINT "controlled by keying numbers "+RV$+"O"+RV$;
55091 PRINT " to "+RV$+"9"+RV$+ "."
55111 PRINT "All other controls remain active when"
55121 PRINT "the display is off."
55122 GOSUB 49600 : RETURN
55181 '
56000 ' P pause
56021 PRINT CL$;
56031 PRINT
56041 PRINT " "+RV$+"P"+RV$
56051 PRINT " turns on the "+RV$+"P"+RV$+"ause."
56061 PRINT
56071 PRINT "It halts both the sort and the display"
56081 PRINT "of the process. You can use any key"
56091 PRINT "(except P) to cancel a pause, including"
56101 PRINT "control letters."
56102 GOSUB 49600 : RETURN
56171 '
57000 ' X stats
57021 PRINT CL$;
57031 PRINT " "+RV$+"X"+RV$
57041 PRINT " turns statistics report on or off."
57051 PRINT
57052 PRINT " It is now ";
57053 IF STATS>0 THEN PRINT "on." ELSE PRINT "off."
57055 PRINT
57061 PRINT "When active, the "+RV$+"X"+RV$+" option reports how"
57071 PRINT "many comparisons and swaps had to be"
57081 PRINT "made to put the array in order."
57082 GOSUB 49600 : RETURN
57181 '
58000 ' L length
58021 PRINT CL$;
58031 PRINT " Keying "+RV$+"L"+RV$+" lets"
58041 PRINT "you change "+RV$+"L"+RV$+"length of the sort array."
58051 PRINT " Current length: "; MAX
58061 PRINT "You'll be asked for the new length when"
58071 PRINT "the current sort is finished."
58075 PRINT
58091 PRINT "Use numbers to enter a length of your"
58101 PRINT "choice, such as 25. The top limit is"
58111 PRINT TOPMAX; "and"; MINMAX; "is the lower limit."
58112 GOSUB 49600 : RETURN
58171 '
59000 ' S seed randomizer
59021 PRINT CL$;
59031 PRINT " "+RV$+"S"+RV$
59041 PRINT "lets you "+RV$+"S"+RV$+"eed the randomizer"
59051 PRINT "that causes variation in the arrays to"
59061 PRINT "be sorted. It's now ";
59063 IF TAKESD>0 THEN PRINT "on." ELSE PRINT "off."
59071 PRINT
59081 PRINT "To provide a seed, hit any key. (Its"
59091 PRINT "ASCII value is used.) The same array"
59101 PRINT "will appear, for a given key,"
59111 PRINT "repeatedly."
59112 GOSUB 49600 : RETURN
59171 '
60000 ' ! exclamation point (terminate)
60021 PRINT CL$;
60031 PRINT
60041 PRINT " "+RV$+"!"+"RV$
60051 PRINT " The exclamation point stops operation."
60061 PRINT
60071 PRINT "It may be keyed any time, except when"
60081 PRINT "a seed is being requested. (It'll be "
60083 PRINT "taken as a seed.) "
60084 GOSUB 49600 : RETURN
60199 '
65000 END' .....
```

Circle 252 on Reader Service card.

POWER PROTECTION FOR YOUR SYSTEM



The Datasaver™ AC Power Backup fits most desktop and portable microcomputer systems. Call **Cuesta Systems, Inc.** at (805) 541-4160 for product information and application literature.

VISA/Mastercard orders.

INSTANT POWER

Circle 65 on Reader Service card.

SAVE MORE THAN EVER ON 3M Scotch DISKETTES!



\$1.95 ea.	5 1/4" SSDD (745)	\$2.89 ea.
Qty. 20	(744)	
	5 1/4" DSDD (745)	\$2.70 ea.
	(745)	Qty. 20

5 1/4" SSDD—96TPI (745)	\$2.89 ea.
5 1/4" DSDD—96TPI (747)	\$3.95 ea.
(Specify soft, 10 or 16 sector.)	
8" SSDD (740)	\$2.07 ea.
8" SSDD (741)	\$2.54 ea.
8" DSDD (743)	\$3.30 ea.
(Specify soft or 32 sector.)	

Lifetime Warranty! \$23.00
3M HEAD CLEANING KITS

Save even more on quantity orders!
Minimum Order: 20 diskettes. Add \$3.00 shipping per 200 diskettes. C.O.D. charge \$1.65 additional.

Visa • Mastercard • Checks
For fast service, call
DISK WORLD!
Nationwide: 1-800-621-6827
In Illinois: 312-944-2788
Suite 4806 • 30 E. Huron Street • Chicago, Illinois 60611

Authorized Distributor
Information Processing Products

32477

Circle 74 on Reader Service card.

When it comes to quality software for microsystems, DYNACOMP delivers:



STARSHIP DOG FIGHT (TRS-80): \$23.95

The Systems ... Apple Atari Canon Commodore Compustar CP/M Franklin H/Z-100 IBM PC Kaypro Morrow NEC North Star Osborne SuperBrain Timex TRS-80

The Software ...

ADVENTURE	BUSINESS	CARD GAMES	EDUCATION
ENGINEERING	GAMES	HOME FINANCE	INVESTING
LANGUAGES	SCIENCE	TAX PLANNING	UTILITIES

Name brand diskettes: \$19.95/10 (SS, SD w/hub ring). Includes FREE plastic storage box. Add \$2.00 shipping.

CALL OR WRITE FOR A FREE CATALOG
DYNACOMP, INC.
1427 Monroe Avenue, Rochester, N.Y. 14618
Telephone: (716) 442-8960

The Low-Down on Downloading

The author's search for a program that could download Basic software from his old computer to his Commodore-64 ended when he came up with the solution that follows.

By Michael Fichtelman

I first saw a Commodore-64 demonstrated at the Info '82 show in New York. It was a good machine for the money, but I had a couple of reservations.

First, I needed a computer that could talk to a serial printer (since I already had one). Second, I already had a fair amount of software for another computer that I wanted to migrate without rekeying. I wanted to be able to send these Basic programs from the old machine to the new one over an RS-232 line. I asked the Commodore representative if these two requirements would be supported by the C-64, and he naturally said yes.

The Mother of Invention

The representative was right, but neither of these tasks can be accomplished without some work. Software to drive the printer must be loaded in order to use a serial printer with the C-64. Programs that perform this job

have been documented elsewhere and are commercially available; however, I couldn't find any programs that would download a Basic program from another computer to the C-64. Of course, there are programs that allow the 64 to emulate a dumb terminal. Transmitted characters are received, displayed and then they disappear.

I needed a program that could receive Basic statements and store them, with the proper pointers, in the C-64's Basic workspace. I wanted to be able to edit, save and run the transmitted program; since an RS-232 download program wasn't available, I wrote one. See Listing 1.

A Look at the Hardware

Before I explain the program, I'll describe the hardware configuration I used. Obviously, it isn't necessary to use an identical configuration, but it may be important when modifying

the program to know the environment it was designed to run in.

First, the C-64's serial port requires a plug-in interface to do the voltage conversions for true RS-232 communication (+9 V or -9 V). This interface is available from Commodore (part 1011A).

I used a simple three-wire setup: pin 3 is connected to receive data; pin 5 is for clear-to-send and pin 7 is the signal ground.

The sending computer transmits over this line at 300 baud (modems usually communicate at 300 baud as well). Transmission begins with three carriage return/line feeds and ends with an ASCII DELETE (\$5F). All transmitted characters are standard ASCII.

Why I Did It

As I said before, I needed a program to download Basic software from my old computer to the C-64. I intended to download this group of programs only once, since I don't have a continuing requirement for transmitting programs from machine to machine. I also knew that I'd have to edit the transmitted programs since Basic statements that run on one machine won't necessarily run on another without modification.

The Basic interpreter performs a number of operations on a program line before it is stored in memory. Basic keywords (print, if, ...) are to

```
1 REM 110 DIMOS$(64),NS(64)
2 REM 120 FORJ=0TO7:READS(J):NEXT:DATA0,0,3,1,0,2,0,4
3 REM 130 Z$="0000000":HX$="0123456789ABCDEF"
4 REM 300 BP=0:OP=0:U$="!":E=0
5 REM 310 PRINT:PRINT">";:INPUT"";:I$=LEN(I$)
6 REM 320 GOSUB1300:IFC$="";:THENBASE=10:GOTO420
7 REM 330 IFC$="H"THENBASE=16:GOTO400
8 REM 340 IFC$="D"THENBASE=10:GOTO400
9 REM 350 IFC$="O"ORC$="Q"THENBASE=8:GOTO400
10 REM 360 IFC$="B"THENBASE=2:GOTO400
```

READY.

Example 1. The transmitted program as stored.

Address correspondence to Michael Fichtelman, 72-61 113 St., Forest Hills, NY 11375.


```

1 DIMOS$(64),NS(64)
2 FORJ=0TO7:READS(J):NEXT:DATA0,0,3,1,0,2,0,4
3 Z$="0000000":HX$="0123456789ABCDEF"
4 BP=0:OP=0:U$="!":E=0
5 PRINT:PRINT">";:INPUT";:I$:L=LEN(I$)
6 GOSUB68:IFC$="":THENBASE=10:GOTO14
7 IFC$="H"THENBASE=16:GOTO12
8 IFC$="D"THENBASE=10:GOTO12
9 IFC$="O"ORC$="Q"THENBASE=8:GOTO12
10 IFC$="B"THENBASE=2:GOTO12

```

READY.

Example 2. This shows the same program as in Example 1 following the editing process.

kenized: The ASCII values for the characters that make up the keyword are "crunched" into a single byte called a token. The interpreter also performs other functions, like initializing variables or dimensioning arrays.

Finally, the program is stored in memory using a linked list format; that is, the first two bytes of every statement contain the starting address, in characteristic 6502/6510 low-byte/high-byte style, of the next Basic line. Each statement is terminated with a null. The first and last addresses of the program also contain nulls for demarcation from other storage areas.

Since downloading these programs needed to be done only once, I wasn't interested in spending a lot of time figuring out a way to duplicate or hook into the interpreter's code. By the way, documentation for this code is sketchy at best.

After some thought, I found a solution. It may not be elegant, but it works. When a Basic Remark is put into RAM, everything following the REM keyword token is stored as an ASCII code. If the REM keyword is edited out of the line, Basic will reinterpret it by crunching tokens and doing whatever else is necessary to make the statement executable.

I decided to write a program that would receive the ASCII-coded program, and insert a dummy line number and REM token before storing the line in memory. It would then be easy to edit the program, delete REMs, change line numbers and let the Basic interpreter do its job.

Traveling Along, Bit by Bit

The download program (Listing 1) is written in standard 6502 assembler

code. I located the start of assembly at address \$C000, because page \$C0 RAM is never used by Basic. The program makes several calls to machine code subroutines in the C-64's kernal.

These kernal routines are documented in the *CBM64 Programmer's Reference Manual*. The program itself is composed of a main routine and four subroutines.

The program first sets the line speed to 300 baud with no parity. Next, the kernal routine SETLFS is called to set up an input file from device 2, the RS-232 port. The SETNAM routine must also be called before opening the file, but the A, X and Y values are set to 0 since no filename will be used. Finally, the input file is opened by calling the Open and CHKIN routines.

Since I decided to store the transmitted Basic program starting at address \$2000, all page pointers are initialized to \$20. The program then tests for the start of transmission. The routine at \$F086 gets a byte from the RS-232 buffer.

The code from \$C043 to \$C04D initializes the index register and line link pointer to 0 and stores 0 at \$2000, the first address of storage for the transmitted program. While it's not necessary to begin storage at this address, I recommend using any address that is a multiple of 1000 because it's easier to keep track of low- and high-byte address pointers.

I used addresses \$8000 and \$8001 as temporary storage for the new line numbers to be appended to transmitted Basic statements. Address \$8000 is initialized to 1 and incremented by one.

After transmission begins, the first two carriage return/line feeds are thrown away. The main loop of the

Circle 84 on Reader Service card.

DOUBLE YOUR 5¼" FLOPPY DISK S.S. STORAGE WITH THE 'MAXIMIZER'

Pays for itself on average of ten uses. Complete with template, easy to use. Satisfaction guaranteed or money back.

Send today!



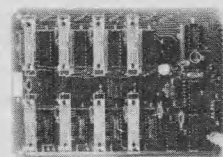
\$24⁹⁵

GATEWAY MAXIMIZER

P.O. BOX 2671 • SOUTH BEND, IN 46680
PHONE: 219-287-3808

Circle 128 on Reader Service card.

FOR THE VIC-20*



- * Four 8-Bit Input Ports
- * Interrupt Capability
- * Four 8-Bit Output Ports
- * Watch Dog Timer

1010 CONTROL INTERFACE BOARD

The 1010 Control Interface is a small board which plugs into the VIC-20's expansion port and provides 32 input bits and 32 output bits. It allows the VIC to interface with the real world for measurement and control applications.

The 1010 Interface allows very cost effective systems to be configured for data acquisition, energy measurement & control, automated test, and laboratory automation. The VIC, with the 1010 Interface, can now be used to automate many tasks that were previously cost prohibited.

Order yours today!

*VIC-20 is a registered trademark of Commodore Business Machines Inc.
1010 Control Interface \$169.00
1901 Double Ended 36" Cable \$7.50
1902 Single Ended 36" Cable \$5.00

Terms: Check, MO, VISA, or MC. In US and Canada add \$4 per order for shipping. Others add \$8 per order. US funds only. TX add 5% tax. Shipped from stock to two weeks.



INNOVATIVE TECHNOLOGY
510 Oxford Park
Garland, TX 75043 (214) 270-8393

Circle 134 on Reader Service card.

BASIC COMPILER NOW ONLY \$40!

BASIC COMPILER \$20

- SUPPORTS INTEGER, REAL, AND STRING DATA
- 25 STATEMENT TYPES
- GENERATES 8080 ASSEMBLER CODE
- RUN TIME LIBRARY SOURCE AVAILABLE (\$50 EXTRA)
- MANUAL ONLY \$5 REF. WITH SOFTWARE PURCHASE
- REQUIRES ASSEMBLER LINKER BELOW

ASSEMBLER/LINKER \$10

- SYMBOLIC 8080 RELOCATABLE ASSEMBLER
- LINK EDITOR/LIBRARY SEARCH CAPABILITIES
- LIBRARIAN FOR LINK EDITOR/LIBRARIES

FREE BROCHURE AVAILABLE

REQUIRES CP/M 80 V2.2 AND 12K
or 1740 SSD OR APPLE II+ 16 SECTOR

DISK FORMATS ONLY

WHEN ORDERING ADD \$10 FOR

SHIPPING, HANDLING AND MEDIA COSTS
MASS. SHIPMENTS ADD 5% SALES TAX
MAKE CHECK OR MONEY ORDER PAYABLE TO

JV SOFTWARE
P.O. BOX 684 • NEWTON, MA 02162

CP/M is a trademark of Digital Research, Inc.
APPLE II is a trademark of Apple Computer, Inc.

program starts at address \$C069. Then you get the next line number and store it. Next, the token for REM (\$8F) is stored. Then, a character is taken from the RS-232 buffer. Before it is stored as part of the Basic line, it undergoes several tests.

Transmitted nulls are thrown away. If the character is a carriage return, a 0 is stored as the end of line marker. If it's a line feed, the end of line routine is called. The last test looks for an ASCII DELETE (\$5F). If this test is true, control is given to the ENDFIL routine. If the character doesn't satisfy any of these criteria, it's stored and the program loops to get the next character.

The Store subroutine simply stores a byte in the next available indexed address. It starts at \$C130.

The subroutine Paging is called whenever the X register is incremented. If the value of X exceeds 255 decimal, all page pointers are incremented and the value of X is reset to 0. This routine is located at \$C0C0.

If the end of a transmitted line is detected, execution transfers to the ENDLIN routine at \$C0D0. This routine pulls the value of X and of the current page, combines them as the low

and high bytes of the starting address of the next Basic line, and stores them in the line link pointer of the previous line. The routine increments the line number before jumping back to the main loop.

The ENDFIL routine at \$C100 is called when MAINLP detects transmission of an ASCII DELETE (\$5F). I used DELETE because it doesn't normally appear in a Basic statement. It's also convenient; simply hitting the delete key on the sending computer signals the end of transmission.

The ENDFIL routine backs up the X register to point to the address immediately following the last good line of Basic. A 0 stored in this address marks the end of the program. Then, the start-of-variables pointer (\$2D-2E) is updated. Finally, all pointers are reset in case the download program is used again. Control jumps to the Basic interpreter routine at \$A480, which warm-starts Basic.

How to Use the Program

Start execution of the Download program at \$C000. Next, initialize transmission of the Basic program from the other machine. Within seconds, the C-64 screen should begin to

fill with lines of received Basic code. If the transmitted Basic program isn't displayed, double-check the hardware connection and be sure that the Download program has been entered correctly.

When the last line of Basic code appears on the screen and transmission is completed, hit the delete key on the sending machine. The C-64 will return to Basic and the READY message will be displayed. The transmitted program can now be listed, saved and edited using all the C-64's functions.

Example 1 illustrates the transmitted program as stored. Example 2 shows the same lines following the editing process. Simply list the program and delete the temporary line number and the REM keyword, or delete the REM and the old line number. Finally, make any other modifications necessary to execute the program on the C-64 and store it on tape or disk.

The concepts and code used in this program can be modified to run on any machine using the 6502 instruction set and the Microsoft version of Basic. The only modifications that may be required for use with the C-64 are the sections of code that detect the start and end of transmission. ■

Listing 1. A program to download Basic to the Commodore-64.

C000	ORG \$C000	C02E	8D 4F 00 STA \$004F
C000	;RS232 BASIC DOWNLOAD	C031	8D 51 00 STA \$0051
C000	;BY MIKE FICHTELMAN	C034	;START INPUT FROM RS232
C000	;START ASSEMBLY AT \$C000	C034	;TEST CR/LF(START OF XMIT)
C000	;SET BAUD RATE TO 300 BD,	C034	20 06 F0 TEST JSR \$F086
C000	;NO PARITY	C037	C9 0D CMP #\$0D ; CR? IF YES
C000	A9 26 LDA #\$26 ; RATE	C039	F0 F9 BEQ TEST ; GET AGAIN
C002	8D 93 02 STA \$0293 ; CNTRL REG	C03B	C9 0A CMP #\$0A ; LF? IF YES
C005	A9 06 LDA #\$06 ; COMMAND	C03D	F0 F5 BEQ TEST ; GET AGAIN
C007	8D 99 02 STA \$0299 ; REGISTER	C03F	C9 1A CMP #\$1A ; SUB? YES,
C00A	A9 0D LDA #\$0D	C041	F0 F1 BEQ TEST ; GET AGAIN
C00C	8D 9A 02 STA \$029A	C043	;INITIALIZE BASIC PROGRAM
C00F	;SET UP LOGICAL FILE (SETLFS)	C043	;STORAGE AT \$2000
C00F	A9 01 LDA #\$01 ; FILE NUMB	C043	;INITIALIZE INDEX AND LINE
C011	A2 02 LDX #\$02 ; DEVICE 2	C043	;LINK POINTER
C013	A0 FF LDY #\$FF ;NO COMMAND	C043	A2 00 LDX #\$00
C015	20 BA FF JSR \$FFBA ;JSR SETLFS	C045	8E 00 20 STX \$2000
C018	;SETUP DUMMY FILENAME(SETNAM)	C048	E8 INX
C018	A9 00 LDA #\$00 ; NAME LGNTH	C049	86 4E STX \$4E
C01A	A2 00 LDX #\$00 ; NAME	C04B	E8 INX
C01C	A0 00 LDY #\$00 ; ADDRESS	C04C	E8 INX
C01E	20 BD FF JSR \$FFBD ; SETNAM	C04D	9D 00 20 STA \$2000,X
C021	;OPEN FILE #1, DEVICE #2	C050	18 CLC
C021	20 C0 FF JSR \$FFC0	C051	;INITIALIZE LINE NUMBER
C024	;OPEN CHANNEL FOR INPUT FROM	C051	;STORAGE TO 1
C024	;LOGICAL FILE #1	C051	A9 01 LDA #\$01
C024	A2 01 LDX #\$01 ;FILE #1	C053	8D 00 80 STA \$8000
C026	20 C6 FF JSR \$FFC6 ;CHKIN	C056	A9 00 LDA #\$00
C029	;SET UP PAGE POINTERS	C058	8D 01 80 STA \$8001
C029	A9 20 LDA #\$20 ; PAGE 20	C05B	;THROW AWAY FIRST TWO
C02B	8D 22 00 STA \$0022	C05B	;CR/LF'S XMITTED

More


```

C05B 20 86 F0 GET1 JSR $F086
C05E C9 0A    CMP ##0A ; LF? NO,
C060 D0 F9    BNE GET1 ; GET AGAIN
C062 20 86 F0 GET2 JSR $F086
C065 C9 0A    CMP ##0A ; LF? NO,
C067 D0 F9    BNE GET2 ; GET AGAIN
C069 ;MAIN LOOP STORES XMITTED
C069 ;BASIC LINE & NEW LINE NUMBER
C069 AD 00 80 MAINLP LDA $8000;LO
C06C 20 30 C1 JSR STORE;BYTE LINE *
C06F AD 01 80 LDA $8001;HIBYTE LINE
C072 20 30 C1 JSR STORE;NUMBER
C075 ;INSERT TOKEN FOR REM
C075 A9 8F    LDA ##8F;REM TOKEN
C077 20 30 C1 JSR STORE
C07A ;STORE XMITTED LINE AS PART
C07A ;OF REM STATEMENT
C07A 20 86 F0 LINLP JSR $F086;GET
C07D C9 00    CMP ##00;IF NULL,
C07F F0 F9    BEQ LINLP;GET AGAIN
C081 ;TEST QUOTE & DISPLAY CHAR
C081 20 84 E6 JSR $E684; QUOTE?
C084 20 D2 FF JSR $FFD2; DISPLAY
C087 C9 0D    CMP ##0D; CR? IF YES
C089 D0 02    BNE LFTST ;REPLACE
C08B A9 00    LDA ##00;WITH NULL
C08D C9 0A    LFTST CMP ##0A;LF? IF
C08F D0 03    BNE DELTST;YES,BRANCH
C091 4C D0 C0 JMP ENDLIN;END LINE
C094 ;TEST FOR ASCII DELETE
C094 ;END OF TRANSMISSION
C094 C9 5F    DELTST CMP ##5F;DEL?
C096 D0 03    BNE CHRSTO;YES GOTO
C098 4C 00 C1 JMP ENDFIL;END FILE
C09B 20 30 C1 CHRSTO JSR STORE
C09E 4C 7A C0 JMP LINLP;GET NEXT
C0A1 00      BRK
C0C0        ORG $C0C0
C0C0 ;SUBROUTINE-
C0C0 ;TEST FOR FULL PAGE
C0C0 ;& INCREMENT PAGE POINTERS
C0C0 ;RESET X
C0C0 E0 FF    PAGINC CPX ##00;FULL?
C0C2 D0 07    BNE PAGRET
C0C4 A2 01    LDX ##00; RESET X
C0C6 E6 51    INC $51;BUMP POINTERS
C0C8 EE 32 C1 INC $C132
C0CB 60      PAGRET RTS
C0CC 00      BRK
C0D0        ORG $C0D0
C0D0 ;SUBROUTINE-
C0D0 ;UPDATE BASIC LINE LINK
C0D0 ;POINTERS
C0D0 86 52    ENDLIN STX $52;NEXT
C0D2 A0 00    LDY ##00;LINE ADDR
C0D4 A5 52    LDA ##52;STORE IN
C0D6 91 4E    STA ($4E),Y;LINK
C0D8 C8      INY
C0D9 A5 51    LDA $51; PAGE ADDR
C0DB 91 4E    STA ($4E),Y;STORE HI

```

```

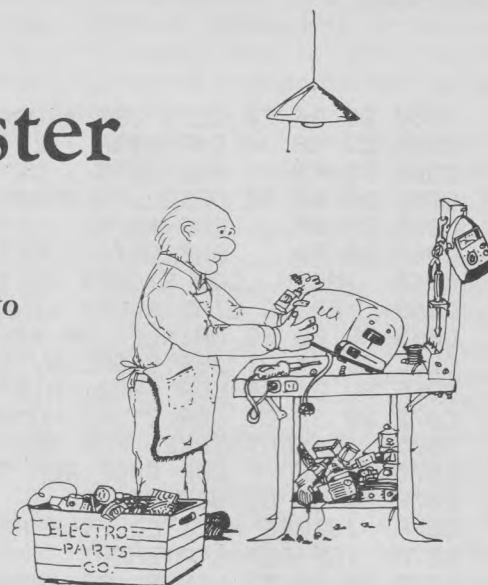
C0DD ;BUMP LINK POINTER
C0DD 85 4F    STA $4F
C0DF 86 4E    STX $4E
C0E1 E8      INX
C0E2 20 C0 C0 JSR PAGINC
C0E5 ;INCREMENT LINE NUMBER
C0E5 EE 00 80 INC $8000
C0E8 AD 00 80 LDA $8000;IF >255,
C0EB C9 FF    CMP ##FF;INC HIBYTE
C0ED D0 03    BNE NOINC
C0EF EE 01 80 INC $8001
C0F2 E8      NOINC INX
C0F3 20 C0 C0 JSR PAGINC
C0F6 ;GET NEXT LINE
C0F6 4C 69 C0 JMP MAINLP
C0F9        BRK
C100        ORG $C100
C100 ;SUBROUTINE-
C100 ;END OF XMITTED BASIC
C100 ;PROGRAM - RESTORE POINTERS
C100 ;AND BRING UP BASIC
C100 CA      ENDFIL DEX; BACK UP
C101 CA      DEX ; POINTER TO
C102 CA      DEX ; LAST ADDRESS
C103 CA      DEX ; OF BASIC
C104 CA      DEX ; PROGRAM
C105 CA      DEX
C106 86 22    STX $22
C108 AD 32 C1 LDA $C132
C10B 85 23    STA $23
C10D A0 00    LDY ##00
C10F A9 00    LDA ##00;STORE NULLS
C111 91 22    STA ($22),Y;AT END
C113 C8      INY ; OF BASIC
C114 91 22    STA ($22),Y;PROGRAM
C116 C8      INY ; STORAGE
C117 91 22    STA ($22),Y
C119 ;RESET ALL POINTERS
C119 8D 31 C1 STA $C131
C11C E8      INX
C11D E8      INX
C11E E8      INX
C11F 86 2D    STX $2D; START
C121 A5 23    LDA $23; OF
C123 85 2E    STA $2E; VARIABLES
C125 A9 20    LDA ##20
C127 8D 32 C1 STA $C132
C12A ; WARM START BASIC
C12A 4C 80 A4 JMP $A480
C12D 00      BRK
C130        ORG $C130
C130 ;SUBROUTINE-
C130 ;STORE XMITTED BASIC
C130 ;PROGRAM STARTING
C130 ;AT ADDRESS $2000
C130 9D 00 20 STORE STA $2000,X
C133 E8      INX
C134 20 C0 C0 JSR PAGINC
C137 60      RTS
C138 00      BRK

```


The Intelligent Toaster

Mark Robillard's series on home control system architecture continues with this tutorial on how to construct the Command Communicator.

By Mark Robillard



In the first article in this series (November 1982), I outlined an architecture for a unique home control system: the UNIMEM computer system. It consists of four major parts: the Command Communicator, the Librarian, the Sense Controller and the Brain (see Fig. 1).

The principal communications interface between man and the system occurs through the Command Communicator.

This article will describe the design and construction of the Command Communicator. Next month, we'll present software listings that, when incorporated with the hardware, will

provide a complete voice command interface.

As I've been saying since the beginning, this circuit may be used as part of any system. The software presented will be a series of useful subroutines to support the hardware. It is up to you to customize their utilization.

The System

The Command Communicator board is actually a complete system on its own (Fig. 2). Circuitry is included on board to accommodate touch-tone detection from remote terminals, voice recognition via word duration and number counting, and voice syn-

thesis for annunciating messages. Controlling all of these functions is a single-chip microcomputer—the now-familiar 8748.

So what does it do? Generally speaking, it has the power to provide a means of intelligently communicating with a device using a combination of keypad entries (touch tone) and human speech.

In a typical high technology control system, like the one I described in the first article, the user should not be burdened with the prerequisites of a knowledge of computers. An interface such as this will convert this user's mumblings into expected control sequences.

Following is a list of duties the Command Communicator must perform:

- Prompt user for input;
- Provide audio feedback for entries;
- Provide audio alarm/attention messages;
- Allow user voice entry of commands;
- Provide touch-tone decoding for remote keypads;
- Vocalize data being presented via the Brain;
- Pass control parameters to the Brain.

As you can see, it basically converts our language into useable commands

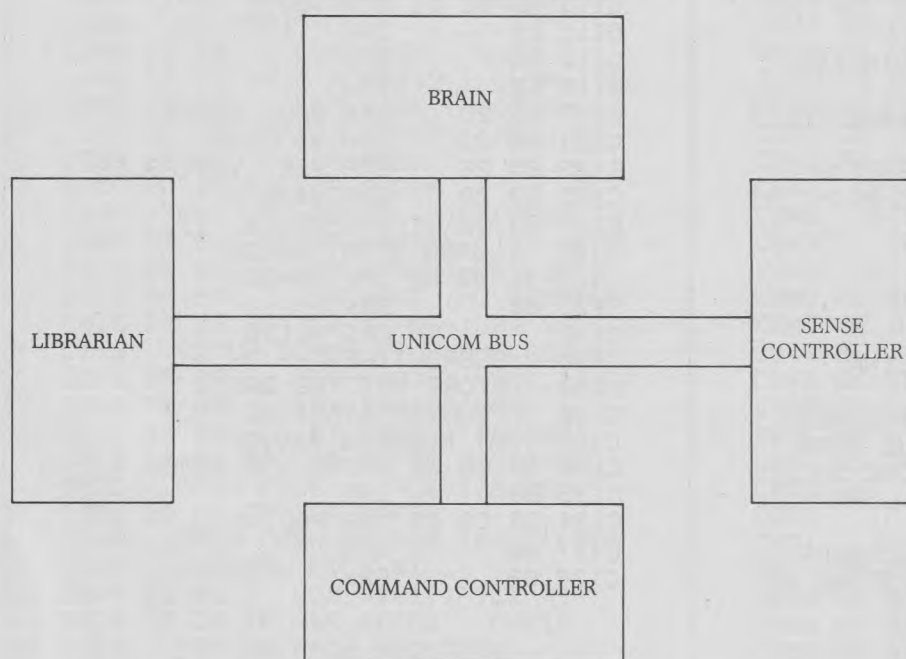


Fig. 1. Block diagram of the UNIMEM Home Control System.

Mark Robillard (MJR Digital, PO Box 630, Townsend, MA 01469) has authored a pair of books on computer-controlled tutorials and applications: *Microprocessor Based Robotics and Hero 1: Advanced Programming and Interfacing* (both published by Howard W. Sams & Co., Inc.).

for the Brain. In a general-purpose system, this Brain may be a piece of intelligent test equipment, a microwave oven or the like.

Voice Synthesis Circuitry

Looking at the schematic of the board (Fig. 3), we see the familiar Votrax SC01A being used as the voice synthesizer for the project. My reasons behind the choice of this product are fairly well spelled-out in the second installment of this series (December 1982). Its ability to provide an unlimited vocabulary makes it a natural.

Do you want to be
running multiconductor cable
all over your home?

Summarizing its operation on the board, we see that the six-bit phoneme code is presented to the chip via port lines P10-P15 of the 8748. This code will be latched and subsequently spoken after the STB line attached to port line P17 is pulsed high. Each phoneme code is sequentially loaded into the chip.

The busy status line A/R, which is connected through a voltage converter to port input P16, should be consulted between each phoneme transmission. The flow diagram and partial schematic of Fig. 4 should explain this protocol graphically.

The SC01A requires a 12-volt power source and the connection of a remote speaker. I suggest that remote speakers be located in small command stations around the home. The on/off button of each would effectively connect the speaker to the system, therefore disconnecting command boxes not in use. (The phoneme codes for each sound were presented in the second installment.)

The volume of the speech signal is controlled by the 10K pot input to the LM386 audio amp. This chip will provide more than enough loudness when connected to a standard 8 ohm speaker.

The frequency pot shown will vary the speed at which the phonemes are spoken. It will vary between an extremely slow series of crackling noises to the familiar sounds of Alvin the Chipmunk!

When it comes to speech synthesis, phoneme codes used to be about the only way you could guarantee an un-

limited vocabulary with a limited amount of memory.

Recently, however, a new process showed up on the marketplace. Allophones are a variation on the phoneme idea. Their sound is more conducive to concatenation. Words put together with allophones sound more

natural.

General Instrument now makes a single-chip synthesizer based on the allophone principle. The GI SP0256-AL2 is available in a 24-pin IC. To hook this part into your Command Controller, use the schematic shown in Fig. 5.

Notice that the allophone code con-

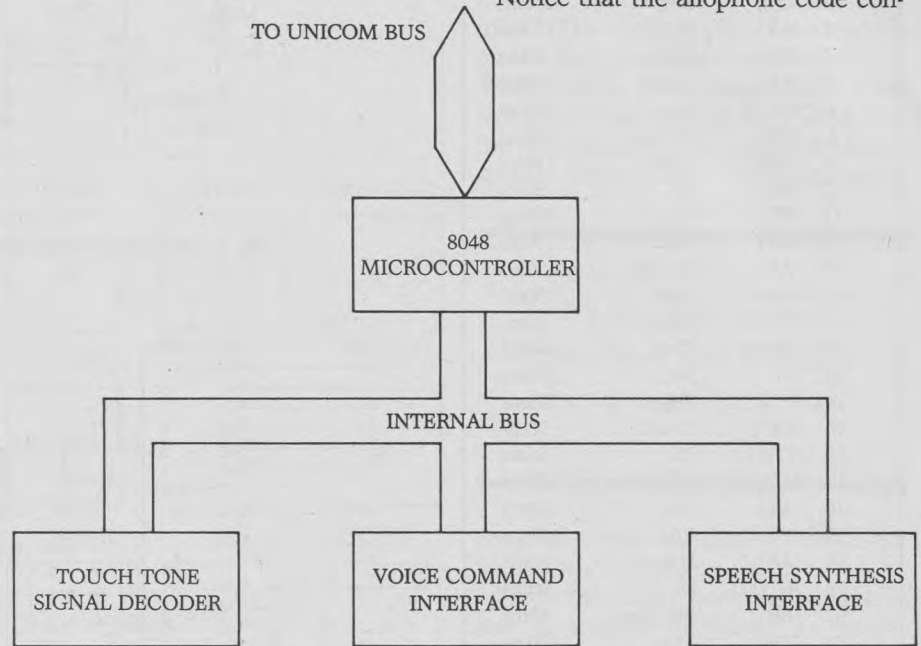


Fig. 2. The Command Communicator—a complete system.

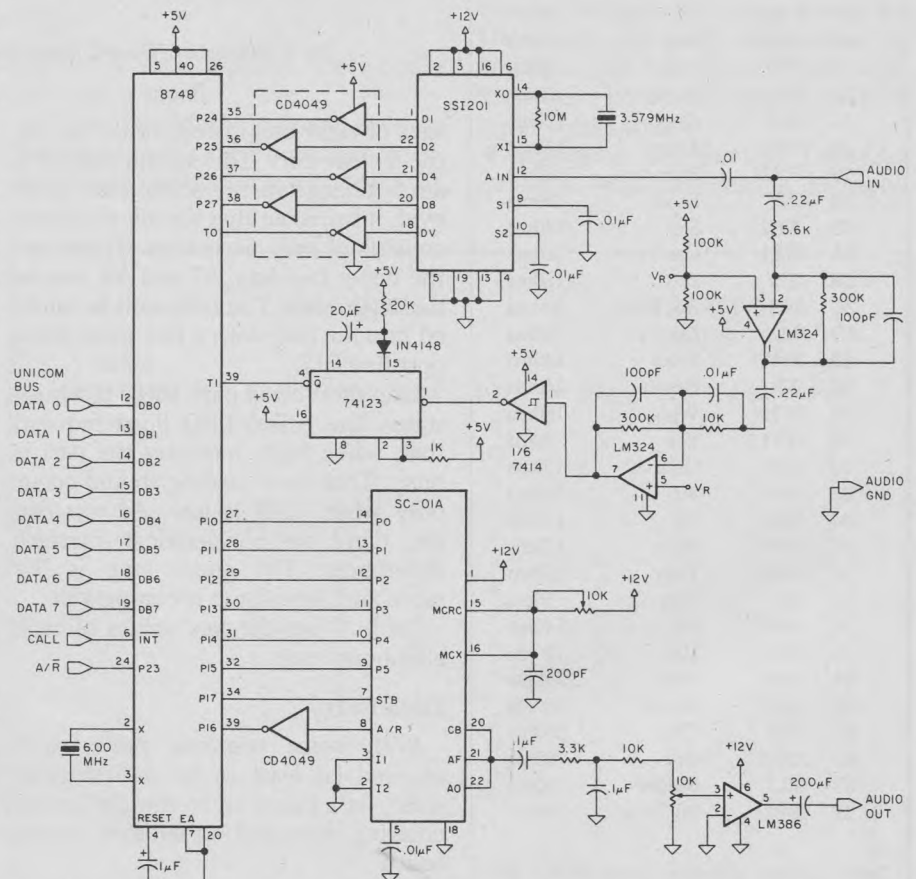


Fig. 3. Schematic diagram of board.

P0-P5 Value	Allophone	Sample Word	Duration
0	PA1	PAUSE	10ms
1	PA2	PAUSE	30ms
2	PA3	PAUSE	50ms
3	PA4	PAUSE	100ms
4	PA5	PAUSE	200ms
5	/OY/	Boy	290ms
6	/AY/	Sky	170ms
7	/EH/	End	50ms
8	/KK3/	Comb	80ms
9	/PP/	Pow	150ms
A	/JH/	Dodge	100ms
B	/NN1/	Thin	170ms
C	/IH/	Sit	50ms
D	/TT2/	To	100ms
E	/RR1/	Rural	130ms
F	/AX/	Succeed	50ms
10	/MM/	Milk	180ms
11	/TT1/	Part	80ms
12	/DH1/	They	140ms
13	/Y/	See	170ms
14	/EY/	Beige	200ms
15	/DD1/	Could	50ms
16	/UW1/	To	60ms
17	/AO/	Aught	70ms
18	/AA/	Hot	60ms
19	/YY2/	Yes	130ms
1A	/AE/	Hat	80ms
1B	/HH1/	He	90ms
1C	/BB1/	Business	40ms
1D	/TH/	Thin	130ms
1E	/UH/	Book	70ms
1F	/UW2/	Food	170ms
20	/AW/	Out	250ms
21	/DD2/	Do	80ms
22	/GG3/	Wig	120ms
23	/VV/	Vest	130ms
24	/GG1/	Guest	80ms
25	/SH/	Ship	120ms
26	/ZH/	Azure	130ms
27	/RR2/	Brain	80ms
28	/FF/	Food	110ms
29	/KK2/	Sky	140ms
2A	/KK1/	Can't	120ms
2B	/ZZ/	Zoo	150ms
2C	/NG/	Anchor	200ms
2D	/LL/	Lake	80ms
2E	/WW/	Wool	140ms
2F	/XR/	Repair	240ms
30	/WH/	Whig	150ms
31	/YY1/	Yes	90ms
32	/CH/	Church	150ms
33	/ER1/	Fir	110ms
34	/ER2/	Fir	210ms
35	/OW/	Beau	170ms
36	/DH2/	They	180ms
37	/SS/	Vest	60ms
38	/NN2/	No	140ms
39	/HH2/	Hoe	130ms
3A	/OR/	Store	240ms
3B	/AR/	Alarm	200ms
3C	/YR/	Clear	250ms
3D	/GG2/	Got	80ms
3E	/EL/	Saddle	140ms
3F	/BB2/	Business	60ms

Table 1. Chart Allophone codes for GI synthesizer.

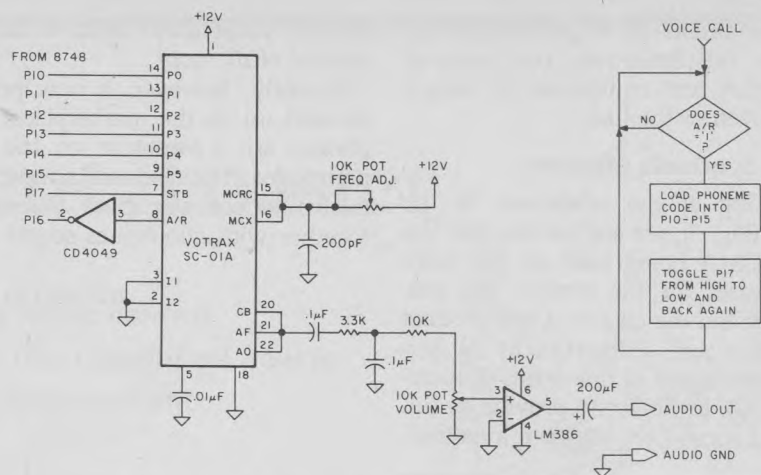


Fig. 4. Schematic of Votrax synthesizer and operational flowchart.

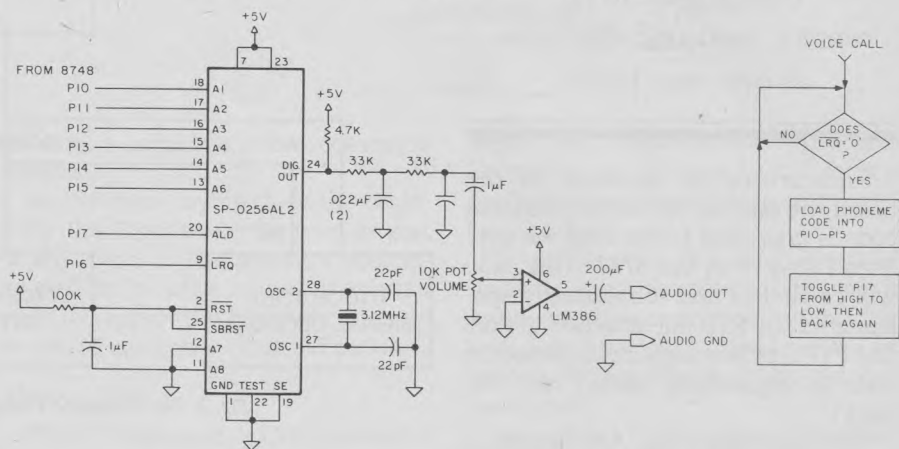


Fig. 5. Schematic of General Instrument synthesizer and operational flowchart.

sists of eight bits instead of the six for the Votrax part. This would require a small change in the schematic; however, it turns out that the allophone set consists of only 64 entries. Therefore, the upper two bits, A7 and A8, can be tied to ground. The code will be latched into the part with a low pulse from port line P17.

Like the Votrax part, there is a busy status line called LRQ (load request) that, when high, indicates the part is busy. Therefore, loading should occur only when LRQ is low. As you can see, there are no electrical interface differences. The audio amp is the same and its volume is comparable.

Table 1 lists the hex values of each allophone code.

Data Entry

With voice response pretty well covered (at least as far as hardware goes), let's move on to the method of entering data and commands to the board.

Twelve- and 16-button keypads have become relatively common-

place, and the advent of the personal telephone has enlivened the touch-tone IC market. These tones, as covered in the third installment of this series, provide a simple interface medium for entering information into an intelligent control system. The fact that they provide an audio output allows a single pair of wires to effect the transmission path.

In a system designed for personal dwelling control, the number of interconnection wires can affect both the cost and certainly the desirability of implementing the hardware. After all, do you want to be running multi-conductor cable all over your home? The rule here should be: the fewer the better.

The Command Communicator presented here uses only three wires to any remote input/output station. These units may be paralleled and scattered all over the house. As I said earlier, the use of an on/off switch physically breaking the input lines will effectively eliminate any contention between units. Three conductor cables and

phone connectors are common and take up little space lying along the baseboard of a room.

The touch-tone signalling system allows for 16 separate codes to be transmitted. Each code consists of a pair of tones—one high-frequency and one low.

There are various methods for detecting each code. Some take an enor-

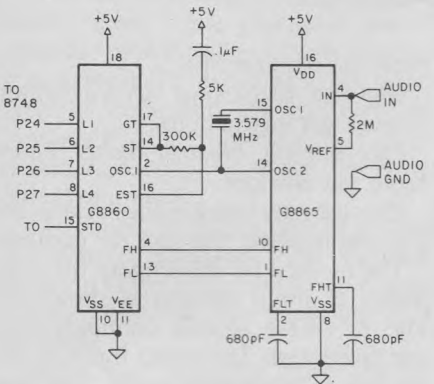


Fig. 6. Schematic of the Mitel/GTE touch-tone receiver.

mous amount of hardware and some, such as the ones presented here, are implemented using LSI technology.

As you can see in Fig. 3, the device in the upper right receives the audio touch-tone signal, converts it to a four-bit binary code and presents it to the micro on the upper four bits of port 2. This device, manufactured by SSI, Inc., is designated the SSI201. It's a 22-pin part that requires a 12-volt supply, and consequently requires the level-shifting CD4049s to convert to a TTL signal.

When the data available (DV) output is logic 1, the processor will detect this level by reading the sense of input T0. During this time, valid data is available at port 2. That's how simple it is to receive tone codes. The chip does everything for you.

Table 2 is a chart showing the codes you'll receive on the upper portion of port 2 for each key press of a tone pad.

Another implementation of the touch-tone receiver is shown in Fig. 6. This system consists of two parts. The input filter (8865) will receive the audio tone signal and split the low-frequency and high-frequency signals. After splitting, the signals are converted to logic levels and passed on to the chip that actually does the decoding.

The 8860 will count, as does a frequency counter, detect and output a binary code proportionate to the input signal—like the SSI201, except that it

takes two smaller chips instead of one 22-pin chip.

Another advantage of the two-chip version is that it requires only +5 V. Fig. 6 explains the particulars of the data-available signal and code outputs.

What more can I tell you about these devices? Other than listing the



Fig. 7. Sample applications input tone keypad design.

address of each supplier, there really isn't much to tell.

What I would like to cover now are the ways in which the board can be interfaced to remote substations and the

control hierarchy of intelligent interaction.

Conversing with Big Brother

Today's credit-verification terminals are a simplified example of the type of service the Command Communicator can provide. The following ideas are listed here to exercise your mind. The final application depends on the type of control you desire.

●Application #1—Temperature Control (Fig. 7). Actuating the TEMP button would cause the controller to respond "enter time." At this point,

It's simple to receive tone codes. The 8748 chip does everything for you.

obviously, enter the time you wish the temperature setting to occur.

After the digits are pressed, the # key is pressed, signalling an entry. "Enter temperature" will then be recited, prompting you to enter the setting. This type of entry-prompting system can be applied to many situations. Date/event and on/off control, for example, could be effected this way. This use of both voice output and tone input works well.

●Application #2—Remote Data Acquisition. While on vacation, have you

TONE DETECTED	SSI CODES				MITEL/GTE CODES			
	P24	P25	P26	P27	P24	P25	P26	P27
1	0	0	0	0	1	0	0	0
2	1	0	0	0	0	1	0	0
3	0	1	0	0	1	1	0	0
4	0	0	1	0	0	0	1	0
5	1	0	1	0	1	0	1	0
6	0	1	1	0	0	1	1	0
7	0	0	0	1	1	1	1	0
8	1	0	0	1	0	0	0	1
9	0	1	0	1	1	0	0	1
0	1	0	1	1	0	1	0	1
*	0	0	1	1	1	1	0	1
#	0	1	1	1	0	0	1	1
A	1	1	0	0	1	0	1	1
B	1	1	1	0	0	1	1	1
C	1	1	0	1	1	1	1	1
D	1	1	1	1	0	0	0	0

Table 2. Chart of output codes for both tone receivers.

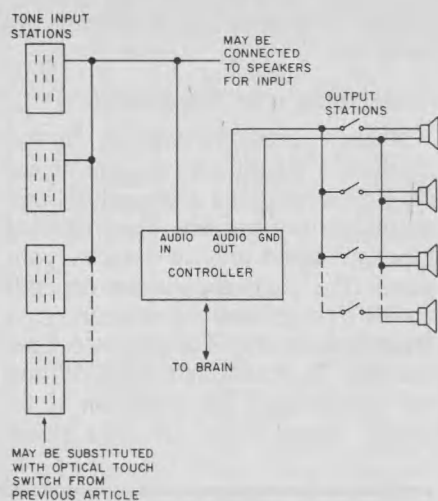


Fig. 8. Typical connection diagram of Command Communicator.

ever wondered how the house is doing? Has someone walked off with your belongings? Is the place on fire?

Well, hook up the controller to a few sensors and a telephone. Call up and request the status of various items. The tone dial on the phone could be used to select from several options. Maybe you could hook it to one of those carrier current control

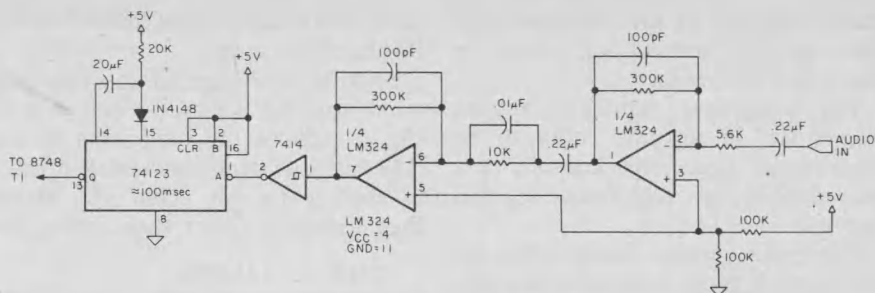


Fig. 9. Schematic diagram of voice recognizer circuit.

boxes, so you can control things by phone.

●Application #3—Commercial Applications. For those of you who would like to put the Command Communicator to use in business, I offer the following suggestions:

Payroll Data Processing: Enter employee numbers and hours worked.

Banking/Credit Verification: Instant account status via telephone.

Order Entry: Enter part number and quantity.

Inventory Status: Enter part number and get status of inventory.

Sales Inquiry: Get instant price changes via phone.

Order Entry, Door-to-Door: Enter

order at customer site.

Highway Breakdown Service: Enter trouble, get instructions.

Pilot Briefing, Weather Status: Enter route, get weather.

This list only touches the surface. As you can imagine, the uses are endless.

The method for hooking up the controller to input stations is shown in Fig. 8, where several configurations are illustrated. The audio input is expecting a touch-tone signal, and the speech output is expecting an 8 ohm speaker.

The first application uses a standard Radio Shack touch-tone pad and speaker housed in a small project box. The second utilizes the optical touch pad presented a few months ago as the tone input system. This would be mounted over the face of a small CRT, where available selections would be displayed. (This particular application will be presented in an upcoming article.)

Voice Recognition

Of course, the ultimate conversational controller would allow the user to vocalize his or her desires. Well, there's no reason we can't provide that option here. Yes, the Command Controller *can* recognize words and sentences, but bear in mind that voice recognition is a tricky subject. The circuit presented here is not 100 percent reliable. It belongs to the class of continuous word-speaker-dependent recognizers.

Look at Fig. 9. The LM324 is acting as a microphone preamp. The speaker at the remote station may be switched to act as a microphone, and the output on pin 7 will swing between ground and close to 5 V. Schmidt trigger 7414 will square up the signal and present all of its peaks to the one-host window detector.

This part is a "retriggerable" monostable. As long as the distance between input pulses (time) is within approximately 100 milliseconds, its output will remain on. This "on" sig-

Circle 112 on Reader Service card.

GOOD NEWS FOR EPSON MX-80 and RX-80 OWNERS

MICRO-GRIP FRICTION FEED

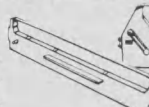
Add inexpensive friction feed to your MX-80 or RX-80. Easily installed with screwdriver, no soldering. Does not disturb tractor feed. Also fits printers based on Epson design such as IBM PC, Commodore and H-P Dot Matrix printers.

Wt. 1 lb. ONLY \$39.95/ea.

CARTRIDGE RIBBONS FOR...

EPSON MX 70/80
EPSON MX 100
RS Daisy Wheel II M/S
RS LP I, IV (Zip Pack)
RS LP I, II, IV (Cart.)

\$5.00/ea.
9.75/ea.
5.75/ea.
2.75/ea.
5.85/ea.



RS LP III, V
RS LP VI, VIII
RS DMP 400
DIABLO Hytype II M/S
OKIDATA 84

\$5.85/ea.
7.00/ea.
5.50/ea.
4.50/ea.
5.00/ea.

COMPUTER PAPER MINI PACKS

9-1/2" x 11" Blank, 20 lb. 1 pt., 1000/ctn.
(Extra fine perforations r. & l.) ONLY \$16.25/ctn.
14-7/8" x 11" 1/2" Green Bar, 15 lb. 1 pt., 1500/ctn.

ONLY \$25.00/ctn.

STANDARD PACKAGING

9-1/2" x 11" Blank, 15 lb. 1 pt. 3300/ctn. ONLY \$26.00/ctn.
14-7/8" x 11" 1/2" Green Bar, 15 lb. 1 pt., 3500/ctn.
ONLY \$40.00/ctn.

PRESSURE SENSITIVE LABELS

ONE ACROSS 3-1/2" x 15/16"
ONLY \$2.70/M
Order in increments of 5,000

ALL COMPUTER SUPPLIES AT DISCOUNT PRICES

TERMS AND CONDITIONS

We require a minimum order of \$10.00, not including shipping charges. Prices effective 7/1/83 and subject to change without notice. To keep prices competitive we operate on cash basis. Credit extended to Federal agencies, but all other institutions and individuals send payment with order, our prices DO NOT include shipping. No C.O.D. orders accepted. We ship via UPS or motor freight. Include street address, we don't ship to P.O. boxes. Freight charges added to credit card purchases. No merchandise returned without prior written authorization from us. Merchandise ordered in error or not wanted is subject to 25% restocking charge and limited to merchandise credit only. Mass. residents add 5% sales tax.

Send for our Free Brochure of Computer Supplies. Ask for Catalog No. DP-50.



BILL COLE ENTERPRISES, INC.

P.O. BOX 60 • DEPT. MC WOLLASTON, MA 02170-0060 • 617-963-5510
For Credit Card Orders ONLY! Call Toll Free 1-800-225-8249

nals that voice is present. When the Q output returns to a 0, then input has stopped.

At this point, you may wonder how this concoction recognizes words. The circuit merely tells the processor when a word is present; the job of analyzing the word is up to the micro. This is done by counting time during active word periods.

To train the system to recognize the word "enter," the processor would store the time duration of that word as you spoke it. To recognize it, the input word is compared against the time "template" for that word. If they match reasonably, you can signal an enter command.

The danger with this type of system is that many words can take the same duration. Grouping words into sentences will help to eliminate this problem.

If you say "open the door," for instance, each word may be timed as well as counted. Both the word-time total and the number of words may be stored as the template. So when you say "activate abort," there won't be a match, even though the two sentences take about the same time to say. The

At this point, you
may wonder how this
concoction recognizes words.

The circuit merely
tells the processor when
a word is present...
the rest is up
to your micro.

key is to adjust the time-out of the 74123 to detect word boundary drop-outs. If the line is inactive for about three seconds, it's safe to assume that the phrase is over.

Control I/O

So far, we've gone over the operation of the various human interface circuits. I have referred to its ability to

control or otherwise pass control parameters on to other systems. The communications path is effected on the left side of the schematic in Fig. 3. The Data Bus lines DB0-DB7 have the ability to pass eight-bit parameters. Port line P23 is used as an accept/request flag to other systems. Normally, this would be at a logic 1, meaning that it is in the accept or listen mode.

Whenever a controller wants to pass a byte of data to another system, it will pull its A/R line low. This may be tied to the interrupt line of another computer. The response from the receiving system would be to lower the Call input. Here that input is tied directly to the interrupt of the micro.

Whenever the host or brain wants to send data, such as emergency message information, to the controller, the Call line will interrupt it, forcing a communication between systems.

Full descriptions of the software necessary to drive a board like this will be included in next month's "Intelligent Toaster" installment. Then I'll present a set of general-purpose subroutines that you can put together to effect your own custom control system. ■

General Instrument
Microelectronics Division
600 West John St.
Hicksville, NY 11802

GTE Microcircuits
2000 West 14th St.
Tempe, AZ 85281

Intel Corp.
3065 Bowers Ave.
Santa Clara, CA 95051

Mitel Semiconductor
PO Box 13320
360 Legget Drive
Kanta, Ontario K2K 1X5

Silicon Systems, Inc.
14351 Myford Road
Tustin, CA 92680

Votrax
Division of Federal Screw Works
500 Stephenson Highway
Troy, MI 48084

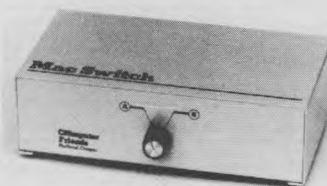
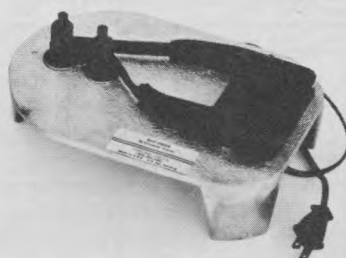
Circle 185 on Reader Service card.

Re-ink any fabric ribbon for less than 5¢. Extremely simple operation. We have a **MAC INKER** for any printer. Lubricant ink safe for dot matrix printheads. Multi-colored inks, uninked cartridges available. Ask for brochure. Thousands of satisfied customers.

\$54⁹⁵ +

Mac Switch lets you share your computer with any two peripherals (serial or parallel). Ideal for word processors—never type an address twice. Ask us for brochure with tips on how to share two peripherals with **MAC SWITCH**. Total satisfaction or full refund.

\$99⁰⁰



Computer Friends Mac Inker & MacSwitch

100 N.W. 86th Ave.
Portland, OR 97229
503/297-2321

Table 3. Addresses of suppliers of parts used in this article.

Apple Gets Healthful Hints From Heath

Each month Microcomputing will publish translations of selected programs published in the magazine. We encourage our readers to submit a hard copy of their conversions along with a cassette or disk of the program. Include a self-addressed, stamped envelope for the return of magnetic media if not selected for publication. Authors whose translations are chosen will receive payment for their efforts.

Healthful Hints for Heath program (January 1983), converted by Joe Good (Box 72, Mentone, IN 46539) to run on the Apple IIe.

```

100 PRINT CHR$(4) "PRM3"
110 REM IT IS ONLY A GUIDE. CONSULT YOUR PHYSICIAN FOR MORE EXACT INFORMATION.
120 REM CONVERTED FROM MICROSOFT BASIC TO RUN ON APPLE IIE
130 PRINT : PRINT
140 HOME
150 PRINT "THIS PROGRAM WILL HELP YOU ASSESS YOUR PRESENT RISK OF HEART"
160 PRINT "DISEASE. IT IS A GUIDE ONLY. FOR MORE EXACT INFORMATION, YOU"
170 PRINT "SHOULD CONSULT YOUR PHYSICIAN.": PRINT
180 PRINT "TO USE THE PROGRAM, JUST ANSWER THE QUESTIONS AS PRESENTED."
190 PRINT
200 PRINT "FIRST, AGE. CHOOSE FROM THE FOLLOWING AGE GROUPS.": PRINT
210 PRINT "1--TEN TO TWENTY YEARS OLD"
220 PRINT "2--TWENTY ONE TO THIRTY YEARS OLD"
230 PRINT "3--THIRTY ONE TO FORTY YEARS OLD"
240 PRINT "4--FORTY ONE TO FIFTY YEARS OLD"
250 PRINT "5--FIFTY ONE TO SIXTY YEARS OLD"
260 PRINT "6--SIXTY ONE AND OVER": PRINT
270 PRINT ": INPUT "WHAT IS YOUR CATEGORY (1-6) ":A
280 IF A < 1 OR A > 6 THEN 210
290 IF A = 5 THEN A = A + 1
300 IF A = 6 THEN A = A + 2
310 HOME
320 PRINT "NEXT IS THE HEREDITY FACTOR. SELECT FROM THE FOLLOWING.": PRINT
330 PRINT "1--NO KNOWN HISTORY OF HEART DISEASE IN THE FAMILY"
340 PRINT "2--ONE RELATIVE WITH CARDIOVASCULAR DISEASE, OVER SIXTY"
350 PRINT "3--TWO RELATIVES WITH CARDIOVASCULAR DISEASE, OVER SIXTY"
360 PRINT "4--ONE RELATIVE WITH CARDIOVASCULAR DISEASE, UNDER SIXTY"
370 PRINT "5--TWO RELATIVES WITH CARDIOVASCULAR DISEASE, UNDER SIXTY"
380 PRINT "6--THREE RELATIVES, UNDER SIXTY": PRINT
390 PRINT ": INPUT "WHAT CATEGORY (1-6) ":H
400 IF H < 1 OR H > 6 THEN 310
410 IF H = 5 THEN H = H + 1
420 IF H = 6 THEN H = H + 1
430 PRINT : PRINT
440 PRINT "NOW FOR YOUR WEIGHT. CHOOSE FROM THE FOLLOWING.": PRINT
450 PRINT "1--MORE THAN 51 POUNDS UNDER THE STANDARD WEIGHT"
460 PRINT "2--FOR YOUR HEIGHT"
470 PRINT "3--BETWEEN -5 AND +5 POUNDS OF THE STANDARD"
480 PRINT "4--21 TO 35 POUNDS OVERWEIGHT"
490 PRINT "5--36 TO 50 POUNDS OVERWEIGHT"
500 PRINT "6--MORE THAN 51 POUNDS OVERWEIGHT": PRINT
510 PRINT ": INPUT "WHAT CATEGORY (1-6) ":W
520 IF W < 1 OR W > 6 THEN 430
530 W = W - 1
540 W = W - 1
550 IF W = 4 THEN W = W + 2
560 IF W = 5 THEN W = W + 2
570 HOME
580 PRINT "SMOKING HABITS ARE NEXT. SELECT FROM THE FOLLOWING GROUPS.": PRINT
590 PRINT "1--NON SMOKER"
600 PRINT "2--CIGAR AND/OR PIPE"
610 PRINT "3--10 OR FEWER CIGARETTES PER DAY"
620 PRINT "4--20 CIGARETTES A DAY"
630 PRINT "5--30 CIGARETTES A DAY"
640 PRINT "6--40 OR MORE CIGARETTES A DAY": PRINT
650 PRINT ": INPUT "WHAT IS YOUR CATEGORY (1-6) ":T
660 IF T < 1 OR T > 6 THEN 570
670 T = T + 1
680 IF T = 3 THEN T = T + 1
690 IF T = 4 THEN T = T + 2
700 IF T = 5 THEN T = T + 5
710 PRINT : PRINT

```

Listing continued.

```

720 PRINT "HOW FOR YOUR EXERCISE PATTERNS. CHOOSE FROM.": PRINT
730 PRINT "1--INTENSIVE OCCUPATIONAL AND RECREATIONAL EXERCISE."
740 PRINT "2--MODERATE OCCUPATIONAL AND RECREATIONAL EXERCISE."
750 PRINT "3--SEDENTARY WORK AND INTENSIVE RECREATIONAL EXERCISE."
760 PRINT "4--SEDENTARY OCCUPATIONAL AND MODERATE RECREATIONAL"
770 PRINT "EXERCISE."
780 PRINT "5--SEDENTARY WORK AND LIGHT RECREATIONAL EXERCISE."
790 PRINT "6--COMPLETE LACK OF ALL EXERCISE": PRINT
800 PRINT ": INPUT "WHICH CATEGORY (1-6) ":E
810 IF E < 1 OR E > 6 THEN 710
820 IF E = 4 THEN E = E + 1
830 IF E = 5 THEN E = E + 1
840 IF E = 6 THEN E = E + 2
850 HOME
860 PRINT "THE AMOUNT OF CHOLESTEROL OR FAT PERCENT IN YOUR DIET IS NEXT."
870 PRINT "YOU MAY CHOOSE FROM THE FOLLOWING.": PRINT
880 PRINT "1--CHOLESTEROL BELOW 180 MG %: DIET CONTAINS NO ANIMAL"
890 PRINT "OR SOLID FATS."
900 PRINT "2--CHOLESTEROL 181-205 MG %: DIET CONTAINS 10% ANIMAL"
910 PRINT "OR SOLID FATS."
920 PRINT "3--CHOLESTEROL 206-230 MG %: DIET CONTAINS 20% ANIMAL"
930 PRINT "OR SOLID FATS."
940 PRINT "4--CHOLESTEROL 231-255 MG %: DIET CONTAINS 30% ANIMAL"
950 PRINT "OR SOLID FATS."
960 PRINT "5--CHOLESTEROL 256-280 MG %: DIET CONTAINS 40% ANIMAL"
970 PRINT "OR SOLID FATS."
980 PRINT "6--CHOLESTEROL 281-300 MG %: DIET CONTAINS 50% ANIMAL"
990 PRINT "OR SOLID FAT."
1000 PRINT ": INPUT "WHAT CATEGORY (1-6) ":C
1010 IF C < 1 OR C > 6 THEN 850
1020 IF C = 6 THEN C = C + 1
1030 HOME
1040 PRINT "NOW FOR YOUR BLOOD PRESSURE. SELECT FROM THE FOLLOWING.": PRINT
1050 PRINT "1--UPPER READING OF 100."
1060 PRINT "2--UPPER READING OF 120."
1070 PRINT "3--UPPER READING OF 140."
1080 PRINT "4--UPPER READING OF 160."
1090 PRINT "5--UPPER READING OF 180."
1100 PRINT "6--UPPER READING OF 200 OR OVER": PRINT
1110 PRINT ": INPUT "WHICH CATEGORY (1-6) ":P
1120 IF P < 1 OR P > 6 THEN 1030
1130 IF P = 5 THEN P = P + 1
1140 IF P = 6 THEN P = P + 2
1150 PRINT : PRINT
1160 PRINT "FINALLY, YOUR SEX. CHOOSE FROM THE FOLLOWING.": PRINT
1170 PRINT "1--FEMALE UNDER AGE 40."
1180 PRINT "2--FEMALE OF AGE 40 TO 50."
1190 PRINT "3--FEMALE OVER 50."
1200 PRINT "4--MALE."
1210 PRINT "5--STOCKY MALE."
1220 PRINT "6--BALD, STOCKY MALE": PRINT
1230 PRINT ": INPUT "FIND YOUR CATEGORY (1-6) ":S
1240 IF S = 4 THEN S = S + 1
1250 IF S = 5 THEN S = S + 1
1260 IF S = 6 THEN S = S + 1
1270 REM
1280 REM TALLY THE FACTORS
1290 REM
1300 GT = A + H + W + T + E + C + P + S
1310 HOME
1320 PRINT "RESULTS OF THIS SHORT QUIZ SUGGEST THAT, BASED ON YOUR"
1330 PRINT "ANSWERS TO THE QUESTIONS, IN LIGHT OF CURRENTLY ACCEPTED"
1340 PRINT "STANDARDS, YOUR RISK OF SUFFERING A HEART ATTACK IS"
1350 REM
1360 REM DETERMINE THE APPROPRIATE RESPONSE
1370 REM
1380 IF GT > 40 THEN 1440
1390 IF GT > 31 THEN 1460
1400 IF GT > 24 THEN 1470
1410 IF GT > 17 THEN 1480
1420 IF GT > 11 THEN 1490
1430 GOTO 1500
1440 PRINT "AT A DANGEROUS AND URGENT LEVEL. YOU SHOULD SEE YOUR"
1450 PRINT "PHYSICIAN NOW.": GOTO 1510
1460 PRINT "AT A DANGEROUS LEVEL.": GOTO 1510
1470 PRINT "MODERATE.": GOTO 1510
1480 PRINT "GENERALLY BELOW AVERAGE.": GOTO 1510
1490 PRINT "BELOW AVERAGE.": GOTO 1510
1500 PRINT "WELL BELOW AVERAGE."
1510 PRINT : PRINT
1520 PRINT "YOU SHOULD BEAR IN MIND THAT THIS SIMPLE ANALYSIS OF YOUR RIS"
1530 PRINT "FACTORS REFLECT MEDICAL CONDITIONS AND HABITS ASSOCIATED WITH"
1540 PRINT "AN INCREASED DANGER OF HEART ATTACK. IT NEITHER MEANS THAT Y"
1550 PRINT "WILL OR WON'T SUFFER ONE, BUT MERELY SUGGESTS POTENTIALS. NO"
1560 PRINT "ALL FACTORS CAN BE QUANTIFIED THIS SIMPLY AND EASILY.": PRINT
1570 PRINT "YOU SHOULD BE GUIDED IN THIS, AS IN ALL MATTERS OF HEALTH, BY"
1580 PRINT "COMPETENT MEDICAL ADVICE. THIS COMPUTER PROGRAM IS NOT A"
1590 PRINT "SUBSTITUTE FOR THAT."
1600 END

```

More

LETTERS TO THE EDITOR

Differing Opinions

I was impressed with the "Buyer's Guide to Systems Under \$1000" (August *Microcomputing*, p. 100) and "Buyer's Guide to \$1000-\$2500 Systems" which appeared in the August and September 1983 issues of *Microcomputing*. The selection guide is excellent. I will be teaching a "personal computer primer" class this fall and the buyer's guide will make an excellent handout for this class.

Myron Miller
Indianola, PA

A Second Opinion

I would like to vigorously protest the waste of paper for "Buyer's Guide to \$1000-\$2500 Systems" (September *Microcomputing*, p. 90). This was an ill-conceived and poorly executed article.

First, only list prices were used. While this may reflect the manufacturer's suggested price for the unit it is clearly fiction as is illustrated by a quick perusal of the ads in your own magazine.

Second, there was no attempt to discriminate between systems such as the IBM, which has only one model available for under \$2000 and the Morrow Micro Decision, which has two models. It is significant that one can purchase a Morrow with dual disk drives for under \$2000.

Third, there was no mention that some of these systems contain significant amounts of software. Again, the Morrow Micro Decision is a case in point. The software included with this machine greatly increases its perceived value to the consumer.

Fourth, component systems such as the Commodore-64 were left out even though a system equivalent to the Morrow, or the Apple would place in the same price range and offer serious computing ability.

Please get back to more serious articles. Pieces like "Disk User or Disk Duffer" (September, p. 80) are the solid food your readers expect from you.

Stevan Jay Vigneaux
Weymouth, MA

A Nasty Habit

I would like to comment on a serious annoyance in the publishing of computer program printouts. Namely, the habit many programmers have of listing remarks in increments of one and the main program steps in increments of ten with occasional odd line numbers in between. Many of us now use one of the many

automatic line numbering programs or systems and such programs are much harder to copy and more prone to errors.

Robert H. Wade
San Diego, CA

Discovering Errors

I discovered several errors and omissions in Thomas Henry's VIC-20 disassembler program ("Discover the Secret of VIC's Inner Structure" p. 62, August 1983). The changes are as follows:

Line 800: The last nine characters of B\$(1) should be changed from 53H????? to 53H13H???

Line 860: The first six characters of B\$(7) should be changed from 25E111 to 25E11K

Line 880: Characters 19-21 of B\$(9) should read 71G, not 71F

Line 900: Characters 19-21 of B\$(11) should read 47G, not 47F

String B\$(15) is missing entirely; add it as line 935: B\$(15) = "16E64K????????64F41F???66A64I????????64H41H???"

In addition to the above changes, there appear to be redundant codes within lines 270 to 330. I shortened the logic as follows:

```
270 F = 1: D = PEEK (P + 1): IF D > 127
```

```
THEN D = (127 AND D) - 128
```

```
300 D = P + D + 2: B = 5: GOSUB 110
```

```
310 C$ = C$ + "A$": D$: RETURN
```

```
320 F = 2: D = PEEK (P + 1) + 256 * PEEK (P + 2): B = 5: GOTO 110
```

```
330 GOSUB 320: GOTO 310
```

Kirk Mendenhall
Boise, ID

Reply:

Well, I'm rather red-faced! All of the corrections that Mr. Mendenhall suggests are correct and his idea for shortening the code is perfectly sound as well. Readers are advised to make these corrections. The program should work well, then, for all types of machine language codes.

The only excuse I can offer is that in trying to make the program look attractive for the printer, I inadvertently truncated string B\$(15) from the listing. The other errors slipped by me as well, since they refer to little-used op-codes in the 6502. Thus, when putting the program through its paces for testing, it seemed to work well since I tested it on machine language programs not using the op-codes in question.

I apologize for any inconvenience this may have caused.

Thomas Henry
Mankato, MN

What Makes Documentation?

Because of the special nature of your periodical and the relative newness of the entire industry, searching for information pertaining to a specific subject is virtually impossible by normal methods. Therefore, I would like to request the following information.

In reviewing software, some sort of standards for documentation must be set. Since your publication reviews software, I would appreciate hearing the opinions of reviewers on what makes software documentation excellent and the things that they look for in doing a review.

My intent is to compile this information from many sources and publish a manual to help software authors with this difficult and often dreaded task. I currently offer a documentation writing service to software authors and will also make personal use of the information you provide.

Kari J. Seger
493 South River Road
Waterville, OH 43566

Where'd They Go?

I purchased my first *Microcomputing* magazine this April, and was delighted to find the section dealing with conversions. I have recently purchased a VIC-20 and was using the conversions to compare the different computer languages.

I also enjoyed the Club Notes section.

What have you done with this part of your magazine? I have just purchased your June issue and much to my disappointment I couldn't find either of these articles. I sincerely hope you don't intend to omit them permanently.

Jerry L. Day
Pottsville, AR

Reply:

In June, we had to omit the Conversions section due to space limitations; however, since June Conversions have been a regular part of *Microcomputing*.

In regards to the Club Notes section, the reason for its absence some months is that we don't always receive enough material for that column.

We are anxious to see Club Notes become a vital section of *Microcomputing*, but we rely on our readers to provide us with club-related announcements.

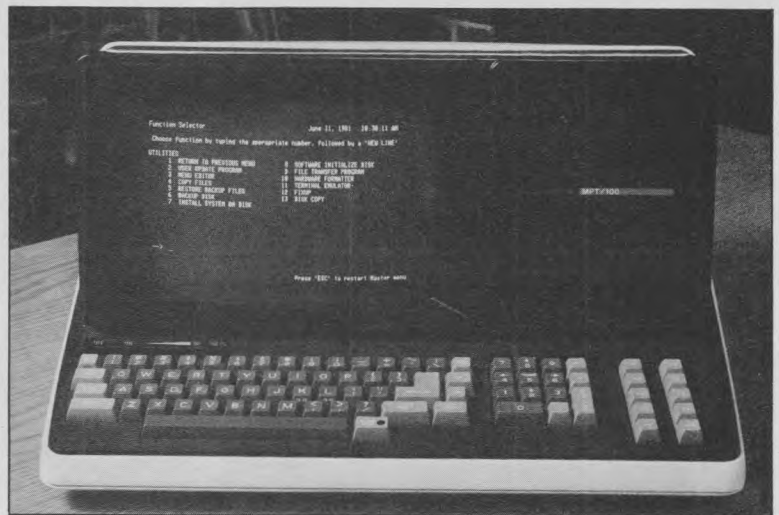
Editors

Buyer's Guide To \$4000-\$6000 Systems

Today's microcomputer market is flooded with a seemingly endless stream of systems—varying in memory, disk drive capacity, screen display size . . . , but which one should you buy? Microcomputing can help you decide. This month we continue our buyer's guide series focusing on

systems in the \$4000 to \$6000 range. It breaks each micro down into 11 categories, so you can compare the capabilities most important to you. Next month, Microcomputing will cover systems in the \$6000 to \$10,000 range.

Manufacturer	Model	Dimensions	Weight	Price	Microprocessor	Bit Configuration	
Alpha Micro (5 models) 17332 Von Karman Irvine, CA 92713	AM-1000	20¼ × 15 × 16½	23-29 lbs.	5850-9167	MC68000	16- to 32-bit	
Altos Computer Systems 2360 Bering Drive San Jose, CA 95131	ACS 586	6½ × 17 × 17¼	40 lbs.	4490	8086	16-bit	
Billings Computer Corp. 18600 E. 37th Terrace S. Independence, MO 64057	6000 system II	20 × 16 × 17	82 lbs.	4725	Z-80A	8-bit	
	6000 system X (B)	20 × 5½ × 17	50 lbs.	4725	Z-80A	8-bit	
Cado Systems Corp. 2055 West 190th St. Torrance, CA 90510	C.A.T. III	18 × 17½ × 19	100 lbs.	5990	8085	8-bit	
Compal 8500 Wilshire Blvd. Beverly Hills, CA 90211	EZType	15 × 18 × 15	40 lbs.	5695	Z-80B	8-bit	
Computer Automation 1800 Jay Ell Drive Richardson, TX 75081	Micro SyFA	18½ × 17 × 19	55 lbs.	5995	8088	8- to 16-bit	
Computershops, Inc. 139 First St. Cambridge, MA 02141	Star-Lite HD20	7½ × 16½ × 16¼	34 lbs.	4995	Z-80A	8-bit	
Compupro 3506 Breakwater Court Hayward, CA 94545	System 816	18½ × 7 × 17	65 lbs.	5495	8085, 8088	8- to 16-bit	
Convergent Technologies 2500 Augustine Drive Santa Clara, CA 95051	AWS Turbo	13¼ × 30	Less than 100 lbs.	4790	8086	16-bit	
Corvus Systems, Inc. 2029 O'Toole Ave. San Jose, CA 95131	Corvus Concept	17 × 15½ × 4½	60 lbs.	4995	MC68000	16- to 32-bit	
Cromemco 280 Bernardo Ave. Mt. View, CA 94039	System One CS1D2	14¼ × 7 × 17½	45 lbs.	4995	Z-80A, 68000	8- to 16-bit	
Data General Corp. 4400 Computer Drive Westboro, MA 01746	MPT/100	12 × 22 × 20	30 lbs.	5350	DG-MN602	16-bit	
Datapoint Corp. 9725 Datapoint Drive San Antonio, TX 78284	1560	12½ × 20 × 22¼	54 lbs.	5750	Z-80A	8-bit	
Digilog Business Systems Welsh Road & Park Drive Montgomeryville, PA 18936	S-1500	21½ × 13¼ × 19¾	50 lbs.	4995	Z-80A	8-bit	
	S-1516	21½ × 13¼ × 19¾	50 lbs.	5995	Z-80A, 80186	8- to 16-bit	
Eagle Computer, Inc. 983 University Ave. Los Gatos, CA 95030	Eagle 1600	monitor 3½ × 11 × 13 cpu 19 × 5½ × 19½ keyboard 19 × 1¼ × 8¼	Less than 100 lbs.	4495	8086	16-bit	
IMS International 2800 Lockheed Way Carson City, NV 89701	IMS 8000 SX	10 × 19 × 28½	97 lbs.	4780	Z-80	8-bit	
	IMS 8000 S	28 × 23½ × 28	263 lbs.	5930	Z-80	16-bit opt.	
Information Solutions 2205 B Fortune Drive San Jose, CA 95131	430/431	24 × 18	25 lbs.	5500	8086, 8087, 8088, 8089	16-bit	



The Data General MPT/100. →

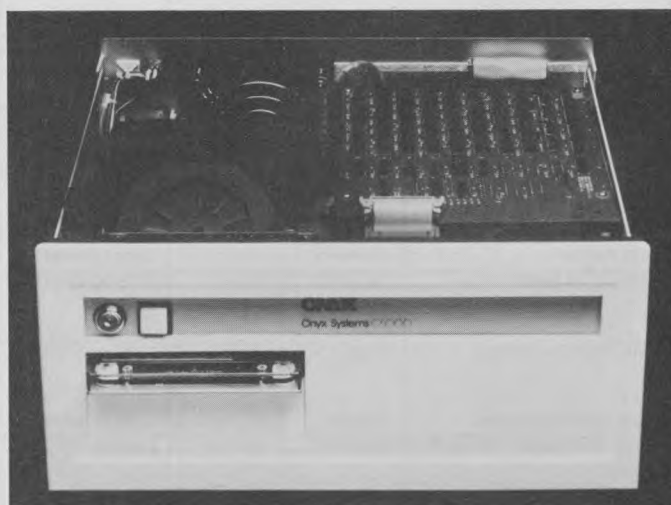
Memory Capacity	Disk Drive		Operating System	Hard Disk	Screen Display	Color	Interface
	Capacity	Size					
128K-384K RAM	800K	5 1/4"	AMOS/L	10M, 5 1/4"	80 x 24	N	RS-232; Parallel opt.
256K-1M RAM, 16K ROM	2M	5 1/4"	CP/M 86	10-40M, 5 1/4"	80 x 132	N	RS-232
64K-576K RAM	720K each	5 1/4"	Proprietary	10M, 5 1/4"	80 x 24	N	Parallel
64K-576K RAM	720K each	5 1/4"	Proprietary	10M, 5 1/4"	80 x 24	N	Parallel; RS-232 opt.
64K-96K RAM, 4K ROM	1.2M	8"	Proprietary	7.5M, 5 1/4"	80 x 25	N	RS-232
64K RAM, 2K ROM	630K	5 1/4"	CP/M	10-32M, 5 1/4" or 8"	80 x 24	N	RS-232; Parallel
64K-256K RAM, 64K ROM	655K	5 1/4"	CP/M 86	10M, 5 1/4"	80 x 24	N	RS-232
64K-1M RAM, 8K ROM	183K	5 1/4"	CP/M 2.2	20M	80 x 24	N	RS-232; Parallel
128K-1M RAM, 32K ROM	12M each	8"	CP/M	up to 160M, 5 1/4"-8"	80 x 24	N	RS-232; Parallel
256K-512K RAM	630K	5 1/4"	CTOS	16.6M, 5 1/4"	80 x 28	Y	RS-232; Parallel
256K-512K RAM	500K	8"	UCSD p-system	5-20M	120 x 48	N	RS-232
256K-2M RAM, 32K ROM	390K	5 1/4"	CDOS	21M, 5 1/4"	80 x 25	N	RS-232; Parallel opt.
64K RAM, 4K ROM	716K	5 1/4"	MP/OS	5-15M, 8" Winchester	80 x 25	N	RS-232; Parallel
64K-128K RAM, 12K ROM	2M	8"	DOS.H	40M, 5 1/4"	80 x 24	N	RS-232
64K RAM	800K	5 1/4"	CP/M	5-15M, 5 1/4"	80 x 24	N	RS-232; Parallel
64K RAM	800K	5 1/4"	CP/M, CP/M 86	5-15M, 5 1/4"	80 x 24	N	RS-232; Parallel
128K-512K RAM	780K	5 1/4"	MS DOS, CP/M 86	10-32M, 5 1/4"	80 x 25	Y	RS-232; Parallel
64K-1M RAM, 4K ROM	2.52M	8"	CP/M or TurboDos	71.37M, 8"	720 x 300 pixels	N	RS-232; Parallel opt.
64K-1M RAM, 4K ROM	2.52M	8"	CP/M or TurboDos	285.48M, 8"	720 x 300 pixels	N	RS-232; Parallel opt.
128K-512K RAM, 512K ROM	2.2M	8"	MPM/86	200M, 5 1/4"	132 x 60	N	RS-232; Parallel



↑ The Jonos C2000 series.

← The Eagle 1600 features 128K to 512K.

Manufacturer	Model	Dimensions	Weight	Price	Microprocessor	Bit Configuration	
Jonos, Ltd. 1835 Dawns Way Fullerton, CA 92631	C2500	7 $\frac{1}{4}$ × 17 $\frac{1}{4}$ × 13 $\frac{1}{4}$	25 lbs.	5995	Z-80B	8-bit	
MAI-Basic Four Business Products PO Box 8350 Albuquerque, NM 87189	SI/10	11 $\frac{1}{4}$ × 20	40 lbs.	5995	Z-80	8-bit	
Micro Five Corp. 17791 Sky Park Circle Irvine, CA 92714	Model 1050	6 $\frac{3}{4}$ × 15 $\frac{1}{2}$ × 16 $\frac{1}{2}$	33 lbs.	4495	8088	16-bit	
Molecular Computer 251 River Oaks Parkway San Jose, CA 95134	Supermicro 8	31 $\frac{1}{2}$ × 12 × 24	150 lbs.	5995	Z-80A	8- to 16-bit	
NNC Electronics 15631 Computer Lane Huntington Beach, CA 92649	Model 80	17 $\frac{1}{2}$ × 11 $\frac{1}{2}$ × 18 $\frac{1}{4}$	80 lbs.	4495	Z-80B	8-bit	
Onyx Systems, Inc. 25 E. Trimble Road San Jose, CA 95131	C5001A	17 × 8 × 15	30 lbs.	5990	Z-80	8-bit	
OSM Computer Corp. 665 Clyde Ave. Mountain View, CA 94043	Zeus 4	8 × 13 × 15	25 lbs.	5595	Z-80, 8088	8- to 16-bit	
Pertec Computer Corp. 17112 Armstrong Ave. Irvine, CA 92714	System 3200	18 × 22 × 12	46 lbs.	5000	MC68000	16- to 32-bit	
Polymorphic Systems 5730 Thornwood Drive Santa Barbara, CA 93117	8813	8 × 20 × 17 $\frac{1}{2}$	52 lbs.	5035	8080	8-bit	





↑ The S/10 from MAI-Basic Four Business Products.



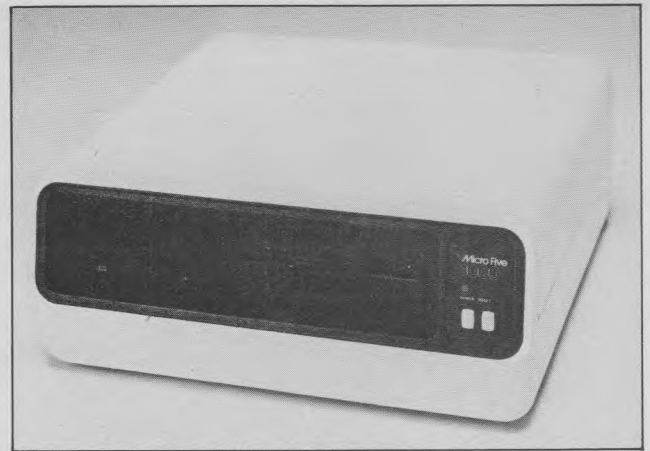
The Vector 4 is an 8/16-bit CP/M system. →

Memory Capacity	Disk Drive		Operating System	Hard Disk	Screen Display	Color	Interface
	Capacity	Size					
128K RAM, 2K-8K ROM	5M	3.9"	CP/M Plus	5M, 3.9"	80 × 25	N	RS-232; Parallel
64K RAM, 20K ROM	655K	5 1/4"	CP/M, BB/M	10-20M, 5 1/4"	132 × 28	N	RS-232
128K-512K RAM, 16K ROM	1M per drive	5 1/4"	CP/M-86	12.8-38M, 5 1/4"	80 × 24	Y	RS-232
64K-1M RAM	500K	8"	Proprietary	10-15M, 5 1/4"	80 × 24	Y	RS-232
64K-1M RAM, 4K ROM	996K	8"	Oasis, CP/M	N/A	80 × 25	N	RS-232; Parallel
192K RAM	N/A	N/A	CP/M	7-21M, 5 1/4"	80 × 24	N	RS-232; Parallel
192K-576K RAM	1M	5 1/4"	Muse (CP/M)	6-19M, 5 1/4"	80 × 24	N	RS-232; Parallel
256K-1M RAM, 16K ROM	2M	5 1/4"	Unix	26M, 5 1/4"	80 × 25	Y	RS-232
32K-104K RAM, 8K ROM	1-2M	5 1/4"	CP/M 2.2	18-104M, 5 1/4"	64 × 16	N	RS-232; Parallel opt.

The Pertec Computer Corp. System 3200. →



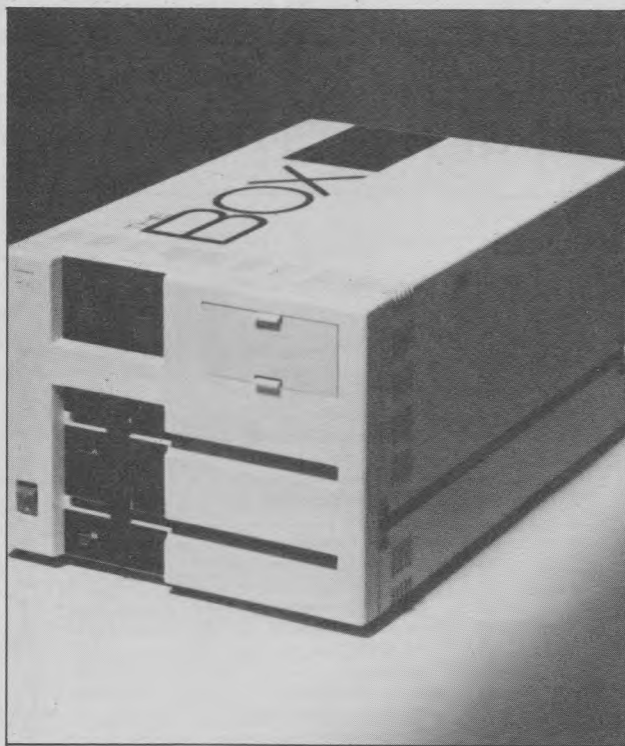
← The Onyx System C5000 series features 5 1/4-inch hard disk storage.



↑ The Micro Five system is an 8088-based, 16-bit computer.

← The Billings 6000 System II.

Manufacturer	Model	Dimensions	Weight	Price	Microprocessor	Bit Configuration
Plessey 17466 Daimler Irvine, CA 92714	6100	5¼ × 19	65 lbs.	5295	LSI 11/2	16-bit
Quasar Data Products 10330 Brecksville Road Cleveland, OH 44141	QDP-100	11 × 18 × 20	65 lbs.	4695	Z-80A	8-bit
Quay Corp. 22 Meridian Road Eatontown, NJ 07724	Model 560	6 × 16 × 18	40 lbs.	4995	Z-80A	8-bit
	Model 900	7½ × 17½ × 22¼	60 lbs.	4995	Z-80A	8-bit
	Model 550	6 × 16 × 18	40 lbs.	4595	Z-80A	8-bit
Sanyo Business Systems 51 Joseph St. Moonachie, NJ 07074	MBC 3000	580mm × 387mm × 646mm	75 lbs.	4995	8085	8-bit
Seiko Computer Systems, Inc. 981 Route 22 Bridgewater, NJ 08807	Series 8600	6 × 18¾ × 15¼	22 lbs.	5425	8086	16-bit
SKS Computers, Inc. 4091 Leap Road Hilliard, OH 43026	SKS 3000	21¾ × 17¾ × 18½	55 lbs.	4495	Z-80A	8- to 16-bit
	SKS 4100	21¾ × 5¾ × 18½	46 lbs.	4995	Z-80B	8- to 16-bit
Tab Products 1451 California Ave. Palo Alto, CA 94304	TAB 830	19½ × 13 × 19½	49 lbs.	5495	8085	8-bit
	TAB 1630	14½ × 13 × 19½	49 lbs.	5995	8088	16-bit
	TAB 1650	19½ × 13 × 19½	49 lbs.	6595	8088	16-bit
Tarbell Electronics 950 Dovlen Place, Suite B Carson, CA 90746	Empire I & II	11¼ × 18	84 lbs.	4661	Z-80	8-bit
Televideo Systems, Inc. 1170 Morse Ave. Sunnyvale, CA 94086	TS-802H	13½ × 22½ × 14¼	44 lbs.	5995	Z-80A	8-bit
Terak Corp. 14151 North 76th St. Scottsdale, AZ 85260	Model 8510B	8 × 12	35 lbs.	5775	LSI-II/21	16-bit
Vector Graphics, Inc. 500 North Ventu Park Road Thousand Oaks, CA 91302	Vector 4	14 × 19	40 lbs.	4495	Z-80B, 8088	8- to 16-bit
Wordplex Corp. 141 Triunfo Canyon Road Thousand Oaks, CA 91360	Model 80-2	18 × 17½	56 lbs.	5100	Z-80	8-bit
ZAX Corp. 8311 Westminster Ave. Westminster, CA 92683	The Box	11 × 8½ × 16½	30 lbs.	5995	Z-80	8- to 16-bit



↑ The Tab System 1630 offers up 786K RAM.

← The Box from ZAX Corp.

Memory Capacity	Disk Drive		Operating System	Hard Disk	Screen Display	Color	Interface
	Capacity	Size					
64K RAM	2M	8"	Opt.	10.4M, 5 1/4"	80 x 24	N	RS-232; Parallel opt.
64K-512K RAM, 8K ROM	1.2M DSDD	8"	CP/M or MP/M	15M internal 30M external, 5 1/4"	Configurable	N	RS-232; Parallel
64K-208K RAM, 32K ROM	800K	5 1/4"	CP/M or MP/M	10M, 5 1/4"	80 x 24	N	RS-232; Parallel
64K RAM, 7K-14K ROM	1.25M	8"	CP/M	33M, 14"	80 x 24	N	RS-232; Parallel
64K-208K RAM, 32K ROM	800K	5 1/4"	CP/M, MP/M	5M, 5 1/4"	80 x 24	N	RS-232; Parallel
64K RAM, 2K ROM	1M	8"	CP/M	5-20M	80 x 24	N	RS-232; Parallel
128K-512K RAM, 16K-20K ROM	1M	5 1/4"	CP/M-86	20M, 5 1/4"	80 x 25	N	RS-232; Parallel
64K-512K RAM, 2K ROM	560K	5 1/4"	CP/M	5-10M, 5 1/4"	80 x 24	Y	RS-232
256K-512K RAM, 2K ROM	560K	5 1/4"	MP/M	5-10M, 5 1/4"	N/A	N/A	RS-232
64K RAM	241K	8"	CP/M	5-20M, 5 1/4"	80 x 24	N	RS-232
128K-768K RAM	241K	8"	CP/M-86	5-20M, 5 1/4"	80 x 24	N	RS-232
256K-768K RAM	241K	8"	MP/M-86	5-20M, 5 1/4"	80 x 24	N	RS-232
64K-1M RAM	500K	8"	CP/M	600M, 8" & 14"	80 x 24	N	RS-232
64K RAM, 4K ROM	600K	5 1/4"	CP/M	20M, 5 1/4"	80 x 24	N	RS-232
64K-256K RAM	1.2M	8"	DEC RT-11	10-40M, 8"	80 x 24	Y	RS-232; Parallel opt.
128K-256K RAM, 12K ROM	630K	5 1/4"	CP/M	5M, 5 1/4"	80 x 24	Y	RS-232; Parallel
64K RAM, 2K ROM	64K	5 1/4"	FDOS	N/A	80 x 24	N	RS-232; Parallel
64K-1M RAM, 24K ROM	2M	5 1/4" or 8"	CP/M	40M, 5 1/4"	12" monitor	N	RS-232; Parallel

Microcomputing® • List of Advertisers

Reader Service Number	Page	Reader Service Number	Page	Reader Service Number	Page
473 Advanced Digital Information Co.	140	349 Enchanted Forest	133	474 Micro Tie Systems Corp.	140
471 Advanced Micro Devices Inc.	140	406 Excalibur Technologies Corp.	121	235 Midwest Micro Inc.	135
109 Alcor Systems	CIII	462 Facit Inc.	136	51 Midwest Software	42
94 Analytical Processes Corp.	20	230 Far West Systems & Software	41	* NRI Schools	43
417 Anderson Bell Co.	122	261 GTEK Corp.	62	411 N-Squared Computing	122
465 Antex Data Systems	138	404 Galleria Micro Systems	123	184 PC World	68
413 Artificial Intelligence Research Group	121	84 Gateway Maximizer	97	172 Pacific Exchanges	54, 77
405 Atlantic Software	120	166 General Electronics Technician	29	212 Pacifica Technology	63
348 Awareco	21	150 General Systems Consulting	41	85 Percom	3
269 BG Micro	61	322 Gladstone Elect.	134	266 Perry Computers	64
131 Bay Technical Assoc., Inc.	123	17 Gloucester Computer Inc.	31	398 Protecto Enterprises	57
112 Bill Cole Enterprises	104	342 Grandma's Software	92	472 QDP Computer Systems	140
54 Bookman Publishing Co.	133	161 Greenbriar Computer Service	39	490 RAK Electronics	130
491 Brown and Company	130	116 Heritage Software Inc.	57	191 Riverlake Systems	29
396 Bytek Computer Systems	27	251 Holmes Engineering	62	123 SLR Systems	64
283 CGRS Microtech	63	420 Human Engineered Software	120	156 Safeware	133
485 CalcShop Inc.	132	489 Human Systems Dynamics	132	410 Satori Software	123
369 Cardco Inc.	CII	285 IBM	10, 11	384 Seequa Computer Corp.	82, 83
98 Cases Inc.	79	421 IBM Systems Product Division	121	205 Selectronics	119
170 Chips & Dale	88	463 IQ Systems	136	402 Sensible Software	120
90 Compucover	94	466 Infotron Systems Corp.	141	14 Sintec	71
371 CompuServe Info Service	89	67 Innovative Data Technology	55	132 Sixty Eight Micro Journal	133
* Computer Continuum	22	128 Innovative Technology	97	416 SoftCraft Inc.	122
18 Computer Design Labs	13	345 International Software Alliance	55	494 Solutions by Example Inc.	130
120 Computer Discount of America	94	467 Interphase Corp.	139	361 Star Micronics Inc.	67
482 Computer Ed.	132	* JRT Systems	75	409 Sublogic	120
185 Computer Friends	105	134 JV Software	97	244 Sun Research Inc.	34
272 Computer Humor	76	41 Jameco Electronics	118	39 Sunlock Systems	138
36 Computer Shopper	94	219 Jaxon	65	318 TNW Corp.	123
492 Computer Software Associates Inc.	130	73 Jibe Electronics	19	189 Tab Sales	138
49 CompuView	4	113 K & P Micro Systems	90	480 Techland Systems Inc.	132
418 CompuView Products	122	389 Key Solutions Inc.	12	339 Techstar Inc.	133
297 Concord Computer Products	116	5 Kisko	65	114 USE Electronics	91
47 Control Data	17	355 Leading Edge Products Inc.	CIV	483 USS Enterprises	135
252 Cuesta Systems	95	373 Logical Devices Inc.	134	493 VM Personal Computing Inc.	130
293 D & N Micro Products	25	165 Lyben Computer Systems	52	484 Valuations Systems Co.	132
461 Data Access Systems Inc.	136	204 Lyben Computer Systems	52	214 Vandata	87
286 Data Basic	145	316 MFJ Enterprises	37	152 Versa Computing	29
310 Data Terminals & Comm	7	115 Mechanix Illustrated	91	469 Videobook Corp.	141
412 Datasoft Inc.	120	325 Mega Byte	52	407 Virtual Combination	121
481 Davidson & Associates	132	382 Memorex	59	* Wayne Green, Inc.	
415 Digital Marketing for Organic Software	121	403 Micro Lab	120	* Binders	133
* Digital Research Comps	117	* Micro Logic	42	* Book Nook	115
414 Digital Research	121	329 Micro Management Systems	80	* Manuscript Ad	125
487 Digital Research	135	* Microcomputing		* Nanos Card	63
250 Discount Software Group	84	* Back Issues	19	* Selectric Interface	51
65 Disk World	95	* Dealer Sell	76	* Shelf Boxes	69
392 Diskette Connection	22	* Foreign Dealers	133	* Timex Sinclair	69
74 Dynacomp, Inc.	95	* Microcomputing Subscriptions	35	64 White Lable Software	133
60 Eastern House Software	23	* Moving	69	486 White Lable Software	134
401 Educational Software Inc.	121	* Run Subscription	131	419 WINDOW Inc.	122
380 Edwards & Associates	92	* Subscription Problems	133	464 Words+ Inc.	141
93 Electronic Specialist	23	* University Micros	92	183 Yield House Inc.	36
488 Emerging Technology Consultants Inc.	135	* Xmas Ad	18	468 Yokagawa Corp of America	138
		259 Micromate Accessories	42	311 York 10 Computerware	139

*This advertiser prefers to be contacted directly.

For further information from our advertisers, please use the Reader Service card.

Special Interests

MASTERING CP/M—by Alan R. Miller For advanced CP/M users or systems programmers who want maximum use of the CP/M operating system, this book takes up where the *CP/M Handbook* leaves off. It will give you an in-depth understanding of the CP/M modules such as CCP (Console Command Processor), BIOS (Basic Input/Output System), and BDOS (Basic Disk Operating System). It explains the incorporation of additional peripherals to the system, console I/O, the use of the file control block and much more. It also includes a library of useful macros and a comprehensive set of appendices. BK 1263 \$16.95

WORDSTAR MADE EASY by Walter A. Ettlin. Now WordStar is as simple to learn as it is easy to use. This book teaches WordStar in 14 easy lessons, saving hours of hard work. It comes with a convenient pull-out Command Card. BK 1239 \$12.95

68000/6809

68000 ASSEMBLY LANGUAGE PROGRAMMING—by Gerry Kane, et al. A straightforward self teaching text book on assembly language programming for the 68000 microprocessor. This book contains the entire instruction set, describes the function of assemblers and assembly instructions and discusses basic software development concepts. A large number of practical programming examples are included. BK1233 \$18.95

6502/Apple/Vic

APPLE MACHINE LANGUAGE—by Don Inman and Kurt Inman. APPLE MACHINE LANGUAGE builds upon your previous knowledge of BASIC, and teaches you the machine language in small, easy, completely illustrated steps. Following this guide, you will be able to write machine language programs directly, using the Apple System Monitor. Each new program is thoroughly presented in functional blocks, with sketches of how each step will actually appear on the video screen. Soon you will be entering and executing your own machine language programs, with predictable results! BK1248 \$14.95



MICROBOOK: DATA BASE MANAGEMENT FOR THE APPLE II—by Ted Lewis This book provides you with an affordable data base management system for your Apple II. These programs turn your Apple II into a combination filing cabinet, information gathering/retrieval system and data processing engine. Written in Pascal, the program simulate a library. Information is maintained and broken down into books, chapters and pages and index to pages. Photographs of the Apple II screen are abundant, and they show you step-by-step the effect of each of your entries. Microbook can be used for almost any application involving the storage and retrieval of information. BK1261 \$19.95

INTRODUCTION TO PASCAL—by Rodney Zaks. A step-by-step introduction for anyone wanting to learn the language quickly and completely. Each concept is explained simply and in a logical order. All features of the language are presented in a clear, easy-to-understand format with exercises to test the reader at the end of each chapter. It describes both standard PASCAL and UCSD PASCAL—the most widely used dialect for small computers. No computer or programming experience is necessary. BK 1189 \$16.95

PROGRAMMING IN PASCAL—by Peter Grogono. A NEW REVISED EDITION. The computer programming language PASCAL was the first language to embody in a coherent way the concepts of structured programming, which has been defined by Edsger Dijkstra and C.A.R. Hoare. As such, it is a landmark in the development of programming languages. PASCAL was developed by Niklaus Wirth in Zurich; it is derived from the language ALGOL 60 but is more powerful and easier to use. PASCAL is now widely accepted as a useful language that can be efficiently implemented, and as an excellent teaching tool. It does not assume knowledge of any other programming language; it is therefore suitable for an introductory course. BK1140 \$12.95

WAYNE GREEN BOOKS

COMPUTER CARNIVAL—by Richard Ramella. Your child can become a crackerjack computerist with the sixty TRS-80 Level II programs in *COMPUTER CARNIVAL*. This large-type, spiral bound book for beginners is a veritable funhouse of games, graphics, quizzes and puzzles. Written by 80 *Micro* columnist Richard Ramella, the programs are challenging enough to ensure continued learning, yet short enough to provide your child with the immediate delight and reward of mastering basic computing skills. And for even greater enjoyment, get the *CARNIVAL COMPANION*, a 30-minute cassette containing all the programs in the book. Eliminates tiresome typing and lets your child spend more time enjoying the programs. BK7389 \$16.97 CC7389 Book and Cassette \$24.97

THE SELECTRIC INTERFACE—by George Young. You need the quality print that a daisy wheel printer provides but the thought of buying one makes your wallet wilt. *SELECTRIC INTERFACE*, a step-by-step guide to interfacing an IBM Selectric I/O Writer to your microcomputer, will give you that quality at a fraction of the price. George Young, co-author of *Kilobaud Microcomputing* magazine's popular "Kilobaud Klassroom" series, offers a low-cost alternative to buying a daisy wheel printer. *SELECTRIC INTERFACE* includes: step-by-step instructions, tips on purchasing a used Selectric, information on various Selectric models, including the 2740, 2980, and Dura 1041, driver software for 280, 8080, and 6502 chips, tips on interfacing techniques. With *SELECTRIC INTERFACE* and some background in electronics, you can have a high-quality, low-cost, letter-quality printer. Petals not included. BK7388 (125 pages) \$12.97

KILOBAUD KLASROOM—by George Young and Peter Stark. Learning electronics theory without practice isn't easy. And it's no fun to build an electronics project that you can't use. *Kilobaud Klassroom* the popular series first published in *Kilobaud Microcomputing*, combines theory with practice. This is a *practical* course in digital electronics. It starts out with very simple electronics projects, and by the end of the course you'll construct your own working microcomputer!

Authors Young and Stark are experienced teachers, and their approach is simple and direct. Whether you're learning at home or in the classroom, this book provides you with a solid background in electronics—and you'll own a computer that you built yourself! BK7386 \$14.95

THE NEW WEATHER SATELLITE HANDBOOK—by Dr. Ralph E. Taggart WB8DQT. Here is the completely updated and revised edition containing all the information on the most sophisticated and effective spacecraft now in orbit. This book serves both the experienced amateur satellite enthusiast and the newcomer. It is an introduction to satellite watching, providing all the information required to construct a complete and highly effective ground station. Solid hardware designs and all the instructions necessary to operate the equipment are included. For experimenters who are operating stations, the book details all procedures necessary to modify equipment for the new series of spacecraft. Amateur weather satellite activity represents a unique blend of interests encompassing electronics, meteorology and astronautics. Join the privileged few in watching the spectacle of earth as seen from space on your own monitoring equipment. BK7383 \$8.95

INTRODUCTION TO WORD PROCESSING by Hal Glatzer. This book explains in plain language what a word processor can do, how to use one, how it improves productivity—especially in businesses that handle lots of words—and how to buy one wisely. No technical knowledge required, for all first-time users and those considering purchasing a word processor. BK1238 \$12.95

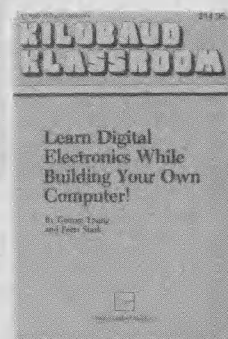
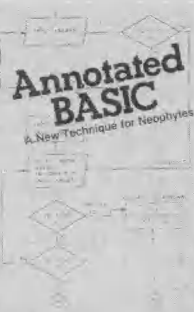
HOW TO MAKE MONEY WITH COMPUTERS—In 10 information-packed chapters, Jerry Felsen describes more than 30 computer-related, money-making, high profit, low capital investment opportunities. BK1003 \$15.00

A USER GUIDE TO THE UNIX SYSTEM by Jean Yates and Rebecca Thomas. Here at last is a clearly written book that allows you to use the Unix operating system easily, and at a fraction of the time it previously took. If you're using, evaluating or simply curious about this system, this is your book. BK 1242 \$17.95

Z-80

PROGRAMMING THE Z-80—by Rodney Zaks. Here is assembly language programming for the Z-80 presented as a progressive, step-by-step course. This book is both an educational text and a self-contained reference book, useful to both the beginning and the experienced programmer who wish to learn about the Z-80. Exercises to test the reader are included. BK1122 \$15.95

INSIDE LEVEL II—For machine language programmers! This is a comprehensive reference guide to the Level II ROMs, allowing easy utilization of the sophisticated routines they contain. It concisely explains set-ups, calling sequences, variable passage and I/O routines. Part II presents an entirely new composite program structure which unloads under the SYSTEM command and executes in both BASIC and machine code with the speed and efficiency of a compiler. Special consideration is given to disk systems. BK1183 \$15.95



TEXTEDIT—A Complete Word Processing System in Kit Form—by Irwin Rappaport. TEXTEDIT is an inexpensive word processor that you can adapt to suit your differing needs—from form letters to lengthy texts. Written in TRS-80 Disk BASIC, the system consists of several modules, permitting the loading and use of only those portions needed. A disk is also available which provides the direct loading of the modules, however, the book is required for documentation. For Model I and III with TRSDOS CONVERT, one disk drive (2 disk drives or copy utility needed to transfer to system disk). Runs under TRSDOS 2.2/2.3. May not function under other systems. BK7387 \$9.97 Disk DS7387 \$19.97

ANNOTATED BASIC A New Technique for Neophytes—Put your BASIC knowledge to work for you with this 2-volume set of TRS-80 Level II BASIC programs. Gain a better understanding of the elements and techniques involved in programming. *Annotated BASIC's* uniquely designed format breaks each program down for you to include: initial documentation and instruction, definitions of New BASIC Concepts, flowchart, annotations of sections, showing how each part fits into the whole, and explaining why certain BASIC commands are chosen over similar ones. Using the programs as they are or modifying them to sharpen your programming skills, *Annotated BASIC* is a helpful tool for any BASIC programmer. BK7384 (Vol. 1, 152 pages) \$10.95 BK7385 (Vol. 2, 136 pages) \$10.95

*Use the order card in this magazine or itemize your order on a separate piece of paper and mail to Microcomputing Book Department • Peterborough NH 03458. Be sure to include check or detailed credit card information. No C.O.D. orders accepted. All orders add \$1.50 for the first book, \$1.00 each additional book for U.S. and foreign surface. \$10.00 per book foreign airmail. Please allow 4-6 weeks for delivery. Questions regarding your order? Please write to Customer Service at the above address.

PRICES SUBJECT TO CHANGE WITHOUT NOTICE

FOR TOLL FREE ORDERING CALL 1-800-258-5473

CONCORD COMPUTER PRODUCTS

2910 'B' E. La Palma
Anaheim, Ca. 92806

(714)
632-6790

send \$1.00
for catalog



10. MIN ORDER / CA. RES. ADD 6%

NO P.O. BOX
SHIPMENTS

CHECK - M/O

ALLOW 2 WKS. DEL'Y. IF
PERSONAL CHECK IS SENT.

Freight:

\$10 - 49 → \$200 | \$250 - 499 → \$900
50 - 99 → \$400 | 500 - 999 → \$1100
100 - 240 → \$800 | 1000 - UP → Call

Store Hours:

Weekdays
10 to 6pm.
Saturday 10 to 3pm.

Diskette SALE!!

"Wabash"

5 1/4 8inch
SS/SD \$17.50 \$21.00
soft

2 ten paks 15.00 ea. 18.00 ea.
for:

SS/DD 26.00 28.00

DS/DD 31.00 35.00

[QTY. PRICE AVAIL.]

Authorized Wabash Dist.

Bare Bones **APPLE II**
EURO

w/o Keyboard = 48K RAM =

\$399.

w/o Pwr. Supply

Microswitch: Power Supply: APPLE
Keyboard: w/ Purchase: Reference Manl.
\$75.00 \$75.00 \$18.00

System I

- Apple Compatible
- 64K RAM
- Key Pad
- Upper/ lower case
- 80 column
- 6502/Z80 Processors

\$825.00

REAL-TIME CLOCK
CALENDAR (MSM 5832)

\$6.45

XTAL
\$2.85

W/ SPEC 1

MONITORS

BMC# BM-12AUW

12in. 15MHz./GREEN Phos.

\$ 94.00

J.C.S.# KG-12N

12in. 18 MHz./GREEN Phos.

Non-Glare Screen

\$119.00

J.C.S.# KG-12NUY

12in. 18 MHz./AMBER Phos.

Non-Glare Screen

\$127.00

BMC# BM-1212EUN

12 in. 20 MHz/green phos.

\$114.00

POWER SUPPLY "for APPLE"

5v → 5.0A

5v → 500ma

12v → 2.0A

12v → 500ma

\$79.50

Apple Cards

IC MASTER
2 Vols

Z80 card \$89.95

80 col. card \$99.95

\$42.95 (82)

\$72.95 (83)

SYSTEM SAVER For APPLE

• Power AC Filter

• Mounts On side

\$73.95

☆ ORDER LINE ☆

(800) 435-0907

(Outside Calif.)

★ Please use for Ordering !!

Super-5 "HALF-HIGH"

• Apple compat. Drive

• Control card

\$274.00

"DATAFAX"

A computerized filing
system using database
programming.

\$159.00

(APPLE)

Diskette Storage BOX

5 1/4 in. > 5 1/2 in. 8 in. > 5 1/2 in.

\$2.50 ea. \$10.00 \$3.50 \$15.00

SPECIALS

2764 → \$12.50

21141-2 → 8/\$13.95

UPD 765 → \$17.50

78H05 → \$5.95

(5amp. 5v.)

Flip & File
Disk Storage Box!
Holds 50 Diskettes

5 1/4" → \$19.95

8" → \$23.95

"TEXTTOOL"
Z.I.F.

16pin → \$6.35

24pin → \$7.95

COMPONENTS

☆ prices subject
to change ☆

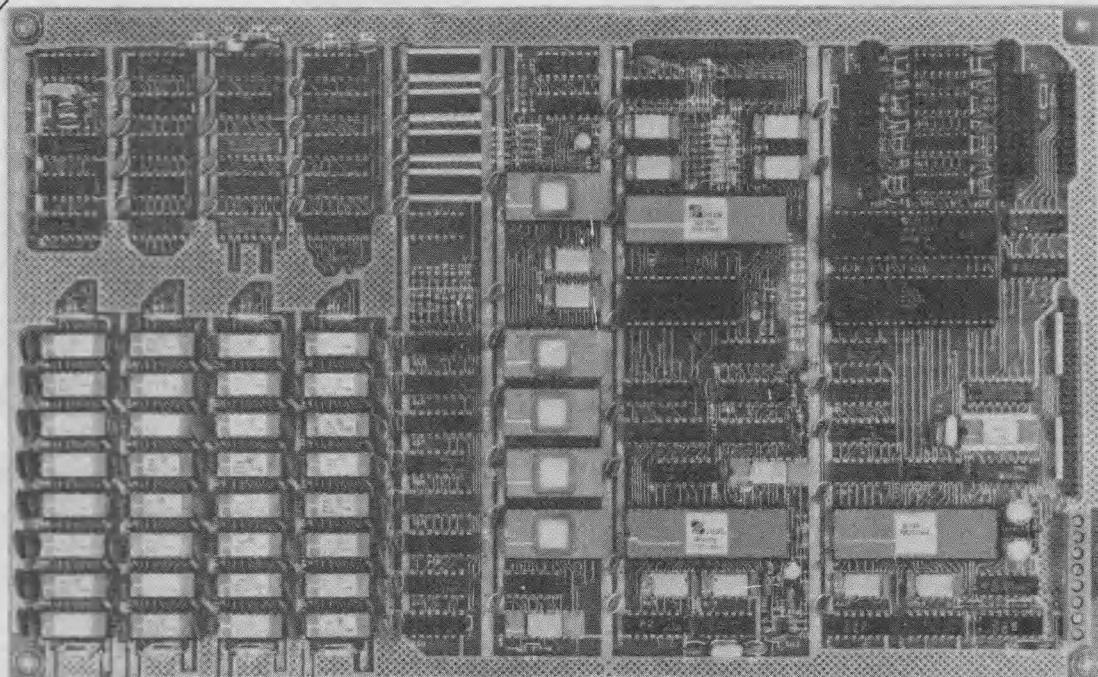
7400															LINEAR																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																														
7400	19	7430	17	7482	85	74126	40	74176	88																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				

**NEW
LOWER PRICES**

"THE ORIGINAL BIG BOARD"
OEM - INDUSTRIAL - BUSINESS - SCIENTIFIC
SINGLE BOARD COMPUTER KIT!
Z-80 CPU! 64K RAM!
(DO NOT CONFUSE WITH ANY OF OUR FLATTERING IMITATORS!)

NEW!

PARTIALLY ASSEMBLED KITS
For All Sockets Installed
And Soldered Add \$50.
(Not For Blank PCB)



WANT MORE INFO?
Full Documentation and
Schematics — \$5.

THE BIG BOARD PROJECT: With thousands sold worldwide and over two years of field experience, the Big Board may just be one of the most reliable single board computers available today. This is the same design that was licensed by Xerox Corp. as the basis for their 820 computer.

The Big Board gives you the right mix of most needed computing features all on one board. The Big Board was designed from scratch to run the latest version of CP/M*. Just imagine all the off-the-shelf software that can be run on the Big Board without any modifications needed.

\$279⁰⁰** (64K KIT BASIC I/O)

SIZE: 8 1/2 x 13 3/4 IN.
SAME AS AN 8 IN. DRIVE.
REQUIRES: +5V @ 3 AMPS
+ - 12V @ .5 AMPS.

FULLY SOCKETED!

FEATURES: (Remember, all this on one board!)

64K RAM

Uses industry standard 4116 RAM's. All 64K is available to the user, our VIDEO and EPROM sections do not make holes in system RAM. Also, very special care was taken in the RAM array PC layout to eliminate potential noise and glitches.

Z-80 CPU

Running at 2.5 MHZ. Handles all 4116 RAM refresh and supports Mode 2 INTERRUPTS. Fully buffered and runs 8080 software.

SERIAL I/O (OPTIONAL)

Full 2 channels using the Z80 SIO and the SMC 8116 Baud Rate Generator. FULL RS232! For synchronous or asynchronous communication. In synchronous mode, the clocks can be transmitted or received by a modem. Both channels can be set up for either data-communication or data-terminals. Supports mode 2Int. Price for all parts and connectors: \$39.95

BASIC I/O

Consists of separate parallel port (Z80 PIO) for use with an ASCII encoded keyboard for input. Output would be on the 80 x 24 Video Display.

BLANK PC BOARD — \$99.95

The blank Big Board PC Board comes complete with full documentation (including schematics), the character ROM, the PFM 3.3 MONITOR ROM, and a diskette with the source of our BIOS, BOOT, and PFM 3.3 MONITOR.

24 x 80 CHARACTER VIDEO

With a crisp, flicker-free display that looks extremely sharp even on small monitors. Hardware scroll and full cursor control. Composite video or split video and sync. Character set is supplied on a 2716 style ROM, making customized fonts easy. Sync pulses can be any desired length or polarity. Video may be inverted or true. 5 x 7 Matrix - Upper & Lower Case.

FLOPPY DISC CONTROLLER

Uses WD1771 controller chip with a TTL Data Separator for enhanced reliability. IBM 3740 compatible. Supports up to four 8 inch disc drives. Directly compatible with standard Shugart drives such as the SA800 or SA801. Drives can be configured for remote AC off-on. Runs CP/M* 2.2.

TWO PORT PARALLEL I/O (OPTIONAL)

Uses Z-80 PIO. Full 16 bits, fully buffered, bi-directional. Uses selectable hand shake polarity. Set of all parts and connectors for parallel I/O: \$19.95

REAL TIME CLOCK (OPTIONAL)

Uses Z-80 CTC. Can be configured as a Counter on Real Time Clock. Set of all parts: \$9.95

CP/M* 2.2 FOR BIG BOARD

The popular CP/M* D.O.S. to run on Big Board is available for \$139.00.

DOUBLE DENSITY ADAPTER BOARD — \$149.95 (A&T)

Requires no cuts or MODS to an existing Big Board. Gives up to 670K storage on a single sided 8 in. diskette. With software to patch your CP/M* 2.2.

PFM 3.3 2K SYSTEM MONITOR

The real power of the Big Board lies in its PFM 3.3 on board monitor. PFM commands include: Dump Memory, Boot CP/M*, Copy, Examine, Fill Memory, Test Memory, Go To, Read and Write I/O Ports, Disc Read (Drive, Track, Sector), and Search PFM occupies one of the four 2716 EPROM locations provided. Z-80 is a Trademark of Zilog.

Digital Research Computers
(OF TEXAS)

P.O. BOX 461565 • GARLAND, TEXAS 75046 • (214) 271-3538

TERMS: Shipments will be made approximately 3 to 6 weeks after we receive your order. VISA, MC, cash accepted. We will accept COD's (for the Big Board only) with a \$75 deposit. Balance UPS COD. Add \$4.00 shipping.

USA AND CANADA ONLY



COMPUTER-PERIPHERAL SWITCHERS

Connect any number of peripherals to a single I/O port — use a single printer to support several microcomputers — use two or more printers to support a single microcomputer — access a modem from any of several microcomputers — ideal for demonstrating or comparing equipment. The Select-Switchers are designed to eliminate the unnecessary plugging & unplugging of cables which connect printers, terminals, or modems to various computers. By using a Select-Switch, you achieve more efficient system operation, better utilization of peripherals & computer ports, eliminate redundant hardware & reduce service calls. 5 yr. limited warranty on all Select-Switches. No power required. Size (inches): 10L x 7W x 3H, 2 lbs.

RS232C SERIAL SELECTO-SWITCH

Switches all lines of asynchronous data • Easy expansion of serial ports • Connectors are female DB25 type

PART NO.	DESCRIPTION	PRICE
GRS232-AB	2-Way Switch	\$139.95
GRS232-ABC	3-Way Switch	\$179.95

DB25 PARALLEL SELECTO-SWITCH

TRS-80, Apple, and IBM compatible • Switches 24 lines (line 1 is ground) • Connectors are female DB25 type

PART NO.	DESCRIPTION	PRICE
GP24-AB	2-Way Switch	\$139.95
GP24-ABC	3-Way Switch	\$179.95

CENTRONICS-STYLE SELECTO-SWITCH

Switches all 36 lines • Connectors are female Centronics

PART NO.	DESCRIPTION	PRICE
GCENT-AB	2-Way Switch	\$199.95
GCENT-ABC	3-Way Switch	\$229.95

Micro-Logic Corp. MICRO-CHARTS

• Fully decoded data • Instant access • 2-sided, totally comprehensive • Compact 8 1/2" x 11" in. durable credit card plastic • Perfect for programmers & engineers • Clear & concise tables for: full instruction set, disassembly, ASCII, base conversion, effect of flags, compare vs. jump, interrupt structure, pinout, cycle times, diagrams, bug notes, & much more...

PART NO.	REFERENCE	PRICE
ML-Z80	Z80 CPU	\$5.95
ML-8080A	8080A/8085A	\$5.95
ML-6502	6502 (65XX)	\$5.95
ML-8048	8048, Relatives	\$5.95
ML-7400	5400/7400 TTL Pin-Outs	\$5.95

BOOKS

30001	National CMOS Data Book (1981) (640 pages) 74C, CD4000, and A/D Converters	\$6.95
30003	National Linear Data Book (1982) (1376 pages) LM, LF, ADC, DAC, LH Series	\$11.95
30008	National Memory Data Book (1980) (464 pages) RAMs, ROMs, PROMs, EPROMs Series	\$6.95
30009	Interall Data Book (1983) (1356 pages) Complete line	\$9.95
30010	National Audio/Radio Handbook (1980) (240 pages) Pre-Amps, AM, FM & FM Stereo, Power Amps	\$5.95
30012	National PAL Data Book (1982) (176 pages) Application Notes, Linear Briefs, etc.	\$5.95
30013	Zilog Data Book (1983) (641 pages) Microprocessors and Support Chips	\$7.95
210830	Intel Memory Components Handbook (1983) (798 pages) Contains all Application Notes, Article Reprints, Data Sheets, and other design information on Intel's RAMs, EPROMs, EEPROMs & Bubble Memories.	\$14.95
210844	Intel Microprocessor & Peripheral Handbook (1983) (1027 pages) Contains Data Sheets on all of Intel's Microprocessors and Peripherals.	\$14.95

ATARI — COMMODORE

JSP	ATARI PADDLE	\$2.49/pair
-----	--------------	-------------

CSP VIC20-C64	COMMODORE PADDLE	\$3.95/pair
---------------	------------------	-------------

TGS-1	TV GAME SWITCH	\$1.95 ea.
-------	----------------	------------

JE300	Digital Thermometer Kit	\$39.95
-------	-------------------------	---------

Universal	Computer Keyboard Enclosures	
DTE-8	Panel Width 7.5"	\$24.95
DTE-11	Panel Width 10.13"	\$27.95
DTE-14	Panel Width 13.5"	\$29.95
DTE-20	Panel Width 18.25"	\$35.95
DTE-22	Panel Width 21.375"	\$39.95

ACCESSORIES FOR APPLE® COMPUTERS

Numeric/Auxiliary Keypad for APPLE II®



The JE614 is a newly introduced numeric/auxiliary keypad for the APPLE II®. It offers the flexibility of a 10-key pad and the convenience of 23 directly accessible functions. Screen-manipulating 10 macros make more processing a snap and cursor controls make the keypad ideal for VisiCalc™ users. The JE614 keypad is housed in a durable metal enclosure and is color-coordinated with your APPLE II computer. Operation of the keypad can begin within minutes from unboxing. Special functions include: Home, Clear, Clear to End of Screen, Scroll-Up, Scroll-Down, Tab, Delete, Left, Right, Up and Down. Each key has auto-repeat.

JE614 Assembled and Tested. \$89.95

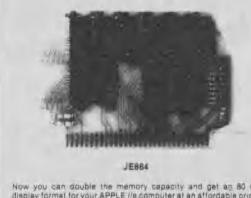
Switching Power Supply for APPLE II, II+ and IIe®



• Can drive four floppy disk drives and up to eight expansion cards • Built-in surge and overload protection • File mode Apple computer • Fully regulated • 5V @ 5A, 5V @ 12V @ 3A, 5V @ 12V @ 3A • Adjustable surge in power (up to 10A @ 9V @ 1/2 hr) • 2 1/2" x 4" x 1 1/2" weight 2 lbs.

Part No. KHP4007 \$79.95

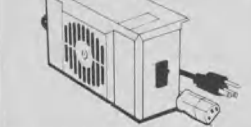
Extended 80 Column/64K RAM Card for APPLE II®



Now you can double the memory capacity and get 80 column display format for your APPLE II computer at an affordable price. Just plug the JE684 card into your APPLE II and expand your display to 80 characters per line. Perfect for word processing. The JE684 also features 64K bytes of additional memory to allow programming not possible with standard APPLE II computers.

JE684 Assembled and Tested. \$149.95

Cooling Fan for APPLE II, II+ and IIe®



• Based on the side of APPLE II, II+ and IIe enclosures • Eliminates overheating problems, thereby increasing reliability and operation life of computer • Blows air from front of fan across as power switch for fan control, and provides built-in outlet

Part No. APF1 \$49.95

5 1/4" HALF-HEIGHT DISK DRIVES

FIT TWO DRIVES IN THE SAME SPACE AS ONE CONVENTIONAL 5 1/4" DRIVE

TEAC FD55A	COMPATIBLE WITH TRS-80 IBM-PC	SHUGART SA455
SINGLE-SIDED:		DOUBLE-SIDED:
• 48 tpi		• 48 tpi
• 40 Tracks		• 40 Tracks
• 250Kbytes single-sided		• 500Kbytes double-sided
• Single/double density		• double density
• Brushless DC direct-drive motor		• Brushless DC direct-drive motor
• Low SW power consumption		• Power req.:
• Power req.:		• +12VDC @ 3A
• +12VDC @ 3A		• +5VDC @ 55A
• 6 msec. track to track		• 6 msec. track to track
• One year warranty		• Compatible with SA400/450
• Size: 5 1/4" W x 1 1/4" H x 8"D		• One year warranty
• Weight: 3 lbs. 5 oz.		• Size: 5 1/4" W x 1 1/4" H x 8"D
FD55A	\$249.95	SA455 \$259.95

Keytronics 90-Key Keyboard

WITH SECURITY KEYLOCK SWITCH

• RFI shielded	
• Cursor controls	
• Numeric keyboard	
• 8-bit Parallel	
• Solid state switches	
• 10 user-programmable keys	
• Positive TTL Logic	
• Size: 17" L x 8 1/2" W x 2 1/4" H	

Made for Visual Technology, this keyboard features: a security keylock (includes two keys) to guard against unauthorized use, an 11-key numeric keypad; cursor controls; and 10 user-programmable keys. Electrical requirements: +5VDC. Color (case): White. Color (keycaps): Black. Complete with case, keyboard assembly, 40-inch interface cable, and schematics. Weight: 7 lbs.

Part No. KB270 \$79.95 each

23" L x 5 1/4" W x 1 3/8" H	MICRO SWITCH 85-KEY KEYBOARD	
	Word Processing Keyboard, 26 Pin Edge Card Connection. Supply Voltage: +5VDC. Main Keyboard is QWERTY. Additional Key Pads for Cursor and word processing functions.	
	Part No. B5SD18-1	\$29.95 each

3" L x 3" W x 1 1/4" H	HI-TEK 14-KEY NUMERIC KEYPAD	
	SPST switching. Charcoal grey keycaps. Mounted on printed circuit board.	
	Part No. K-14	\$9.95 each

	POWER SUPPLY +5VDC @ 1 AMP REGULATED	
	Transaction Tech	
	Output: +5VDC @ 1A (also +30VDC) reg. Input: 115VAC 60Hz, 2-line (black/beige) self-enclosed case. 9 ft. 3 cond. black power cord. 6 1/2" W x 7" D x 2 1/4" H. Wt. 3 lbs. Data sheet incl.	
	Part No. PS51194S	\$14.95 each

	POWER SUPPLY +5VDC @ 3 AMP REGULATED	
	Deftron	
	Input: 115VAC, 47-440Hz. Output: 5VDC Adjustable @ 3 amp. 5VDC @ 2.5 amp. Adjustable current limit. Ripple & Noise: 1mV rms. SWM p-p — 2 mounting surfaces. UL recognized. Size: 4" W x 5 1/2" L x 2 1/2" H. Wt. 1 lb. Data sheet included.	
	Part No. DQ5-1	\$29.95 each

	POWER SUPPLY +5VDC @ 7.5 AMP, 12VDC @ 1.5 AMP SWITCHING	
	Input: 115VAC, 50-60Hz @ 3 amp/230VAC, 50Hz @ 1.5 amp. Fan vol./power supply select switches (115/230VAC). Output: 5VDC @ 7.5 amp, 12VDC @ 1.5 amp. 8 ft. blk. pow. cord. 11 1/2" W x 13 1/2" L x 3 1/4" H. Wt. 6 lbs.	
	Part No. PS54V05	\$39.95 each

	POWER SUPPLY 4-Channel Switching - Apple Compatible	
	FOR USE AS AN EXTERNAL POWER SUPPLY FOR APPLE Microprocessor, mini-computer, terminal, medical equipment and process control applications. Input: 90-130VAC 47-440Hz. Output: +5VDC @ 5A, +5VDC @ 1A, +12VDC @ 1A. Line reg. ±0.2%. Ripple: 30mV p-p. Load reg. ±1%. Overcurrent protection. Adj. 5V main output ±10%. 5.3V/0.1% ±1.7V/8" W x 4.5/16" H. Wt. 1 1/2 lbs.	
	Part No. FCS-604A	\$69.95 each

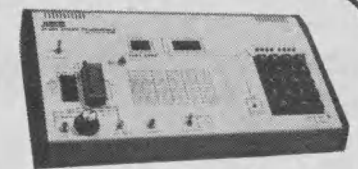
\$10.00 Minimum Order — U.S. Funds Only
California Residents Add 6 1/2% Sales Tax
Shipping — Add 5% plus \$1.50 Insurance
Send S.A.S.E. for Monthly Sales Flyer!

Spec Sheets — 30c each
Send \$1.00 Postage for free 1984 JAMECO CATALOG
Prices Subject to Change

Mail Order Electronics • Worldwide

MasterCard JAMECO ELECTRONICS VISA

1355 SHOREWAY ROAD, BELMONT, CA 94002
11/83 PHONE ORDERS WELCOME — (415) 592-8097 Telex: 176043



JE664 EPROM PROGRAMMER

8K TO 64K EPROMS — 24 AND 28 PIN PACKAGES

• Programs, validates, and checks for properly erased EPROMs • Emulates PROMs or EPROMs • RS232C computer interface for editing/program loading • Loads data into RAM by keyboard • Changes data in RAM by keyboard • Loads RAM from an EPROM • Compares EPROMs for content differences • Copies EPROMs • Power Input: 115VAC, 60Hz, 10W power consumption • Enclosure: Color-coordinated, light tan panels w/molded mocha brown pieces • Size: 15.5" L x 8 1/2" W x 3 1/4" H. Wt. 5 lbs.

JE664-A EPROM Programmer Assembled & Tested (includes JM15A Module) \$995.00

JE665 — RS232C INTERFACE OPTION — The JE665 RS232C interface option implements computer access to the JE664 A RAM. Sample software written in BASIC provided for TAs-800 Computer I, Level I Computer. Baud rate 9600. Word length 8 bits — odd parity. Stop bits 2. Option may be adapted to other computers. The JE665 can be interfaced to any computer with an RS232C port. Information is also provided for interfacing to any CP/M system with an RS232C port.

JE664-ARS EPROM Programmer w/JE665 Option Assembled & Tested (includes JM15A Module) \$1195.00

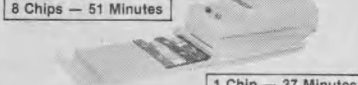
EPROM JUMPER MODULES

The JE664 JUMPER MODULE (Personality Module) is a plug-in Module that pre-tests JE664 for proper programming pulses to the EPROM & configures EPROM socket connections for that particular EPROM

PIN	EPROM	EPROM MANUFACTURER	PRICE
JM08A	2708	AMD, Motorola, National, Intel, TI (25V)	\$14.95
JM16A	2716 TMS2716	Intel, Motorola, National, NEC, TI (25V)	\$14.95
JM16B	TMS2716	Motorola, TI (+5, -5, -12)	\$14.95
JM32A	TMS32C	Motorola, TI (25V)	\$14.95
JM32B	2732	AMD, Fujitsu, NEC, Hitachi, Intel (25V)	\$14.95
JM32C	2732A (21V)	Fujitsu, Intel (21V)	\$14.95
JM44A	MC68076A	Motorola (21V)	\$14.95
JM44B	MC68076A	Intel (21V)	\$14.95
JM44C	TMS2964	TI (25V)	\$14.95
JM44D	HN482764G-4	Hitachi (25V)	\$14.95

UV-EPROM Eraser

8 Chips — 51 Minutes



1 Chip — 37 Minutes

Erases 2708, 2716, 2732, 2764, 2916, 2532, 2564. Erases up to 8 chips within 51 minutes (1 chip in 37 minutes). Maintains constant exposure distance of one inch. Special protective foam liner eliminates static build-up. Built-in safety lock to prevent UV exposure. Compact — only 9.00" x 3.70" x 2.80". Complete with holding tray for 8 chips.

DE-4 UV-EPROM Eraser \$79.95

UVS-11EL Replacement Bulb \$16.95

IBM MEMORY EXPANSION KIT

SAVE HUNDREDS OF \$\$\$ BY UPGRADING MEMORY BOARDS YOURSELF!

Most of the popular memory boards allow you to add an additional 64K, 128K, 192K, or 256K. The IBM64K Kit will populate these boards in nine 64K RAM chips in the provided sockets and set the two groups of switches. Directions are included.

IBM64K (Nine 200ns 64K RAMs) \$49.95

EXPAND YOUR MEMORY

TRS-80 to 16K, 32K, or 48K

**Model 1 = From 4K to 16K Requires (1) One Kit

Model 3 = From 4K to 48K Requires (3) Three Kits

Color = From 4K to 16K Requires (1) One Kit

**Model 1 equipped with Expansion Board up to 48K Two Kits Required — One Kit Required for each 16K of Expansion —

TRS-16K3 *200ns for Color & Model III \$12.95

TRS-16K4 *250ns for Model I \$10.95

TRS-80 Color 32K or 64K Conversion Kit

Easy to install kit comes complete with 8 color 4164-2 (200ns) 64K dynamic RAMs & conversion documentation. Converts TRS-80 color computers with E circuit boards, & all new color computers to 32K. Minor modifications of 32K memory will allow the use of all the 64K of the dynamic RAM providing you have a FLEX DOS operating system.

TRS-64K2 \$44.95

5 1/4" Mini-Floppy Disk Drive

FOR TRS-80 MODEL I COLOR COMPUTER

Features single or double density. Recording mode: FM single. MFM double density. Seek time: 25msec. track to track. Power: +12VDC (±0.6V) 1.5A max. +5VDC (±0.25V) 0.8A max. Unit as pic. at right does not incl. case, power supply, cables, 30-pg. data book incl. Wt. 3 1/2 lbs. Size: 5 1/4" W x 5 1/4" D x 3 1/4" H.

Part No. Limited Quantity! Price

FD200 Single-sided, 40 tracks, 250K bytes capacity \$179.95

FD250 Double-sided, 35 tracks, 438K bytes capacity \$199.95

8" FLOPPY DISK DRIVE

Siemens

• Shugart 801R compatible

• Single-Sided

• 77 Tracks

• 400/800K Bytes Capacity

• Industry Standard

The FDD100-8" Floppy Disk Drive (Industry Standard) features single or double density. Recording mode: FM single, MFM double density. Transfer rate: 250K bits/sec. Single density: 500K bits/sec. Double density: The FDD100-8" is designed to work with the single-sided soft sector IBM Diskette I, or disk cartridge. Power: 115VAC @ 50-60Hz, ±24VDC @ 1.7 amps max. +5VDC @ 1.0 amps max. Unit as pictured above (does not include case, power supply, or cables). Size: 8.55" W x 14" L x 4.5" H. Weighs 12 lbs. Incl. 96-pg. manual.

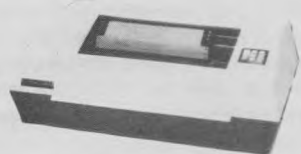
Part No. Price

FDD100-8" \$169.95 ea.



SYLVANIA MONITOR

- 12 inch, P4 phos
- 40 x 24 characters
- composite video
- shipping wt. 30 lbs.
- \$35.00 f.o.b. our warehouse



SERIAL PRINTER

- upper/lower case & graphics capability
- bidirectional, 132 character line
- RS232, 120 cps, ASCII, 7 x 9 dot matrix
- built in self test
- sprocket feed, 2 1/2" to 15" width
- 110, 300, 1200 bps
- keyboards available (limited quantity) \$75.00
- shipping wt. 80 lbs.
- \$500.00 f.o.b. our warehouse



DUAL DISK DRIVE CABINET

- FITS ALL Shugart 800 series
- 115 VAC motor supply & all cables
- shipping wt. 30 lbs.
- \$50.00 f.o.b. our warehouse

CONRAC RGB MONITOR

- 19 inch
- 80 x 24 characters—500 line res.
- no cabinet
- shipping wt. 75 lbs.
- RGB video in \$475.00
- composite video in \$575.00
- all prices f.o.b. our warehouse

PERKIN-ELMER

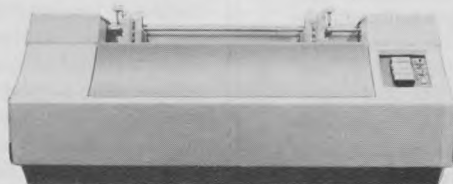
Only Selectronics could bring you this unbelievable opportunity to own the finest high quality KSR terminal ever made. These machines originally listed for more than \$4200. Check these outstanding features:

- * Letter quality printing with upper and lowercase
- * Microprocessor controlled
- * 76-key alphanumeric keyboard with 10-key numeric pad
- * EIA RS232C asynchronous serial interface
- * 40 cps print rate
- * 132 character buffer



- * Full or half duplex
- * Parity—odd, even, none
- * Replacable print cups and elements

Excellent Condition— \$650.00 f.o.b.
Shpt. Wt. 100# our warehouse



CENTRONICS 101A

- 164 cps, ASCII, 9 x 7 dot matrix
- tractor feed (adjustable to 15")
- Centronics parallel
- interfaces available (call for prices)
- shipping wt. 120 lbs.
- \$225.00 upper case only
- \$350.00 u/l case & graphics
- all prices f.o.b. our warehouse



SHUGART 8" DISK DRIVE

- SS/DD
- Model 800-2
- requires 115VAC (24VDC, +5VDC, -5VDC)
- \$140.00 (new)
- \$100.00 (used) limited useage
- shipping wt. 16 lbs.
- all prices f.o.b. our warehouse

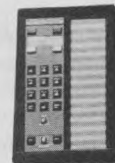


CONRAC MONITOR

- 9 inch, P4 phos
- 80 x 24 characters
- composite video in (RCA phono)
- controls in front panel
- shipping wt. 30 lbs.
- \$45.00 f.o.b. our warehouse

TELEPHONE DIALERS

- 32 number memory
- last number redial
- works on pulse or tone
- battery back up
- shipping wt. 5 lbs.
- \$20.00 f.o.b. our warehouse



HAZELTINE 1410 BRAND NEW

- 24 x 80 characters
- 5 x 7 dot matrix, block cursor
- 64 displayable ASCII char.
- White on black background
- 2048 x 8 Random Access Memory
- EIA RS232C at 110, 300, 600, 1200, 1800, 2400, 4800, or 9600 baud (switch selected)
- Odd, Even, One or Zero (switch selected)
- Half duplex or full duplex (switch selected)
- 15 1/2" wide 13 1/2" high 20 1/2" deep 28 lbs.
- Fully addressable cursor
- \$300.00 f.o.b. our warehouse



OMNITECH ACOUSTIC COUPLER

- 300 baud
- originate only
- tested before shipment
- shipping wt. 10 lbs.
- \$50.00 f.o.b. our warehouse



DIRECT LINE MODEMS

- Bell 103 compatible
- Auto ans/originate
- 300 Baud-RS 232
- Modular jack connectors
- shipping wt. 5 lbs.
- \$89.00 f.o.b.

Yes—We do accept VISA & Mastercard

SELECTRONICS

1229 S. Napa Street Philadelphia PA 19146
Phone: (215) 468-4645 • (215) 468-7891

Micro Software Digest

Compiled by Tracy Mayor

Micro Software Digest presents capsulized software reviews from various computer-related publications.

HES MON

System Requirements: Commodore VIC-20; 5K RAM

Manufacturer: Human Engineered Software, 71 Park Lane, Brisbane, CA 94005

Price: \$39.95

Comments: HES MON provides machine-language monitor and assembler capabilities. According to the review, programmers "who want to explore the mysteries of the machine will probably use this package." You can speak to the machine in its own language and the assembler uses mnemonics to replace hexadecimal numbers.

It's also possible to write programs for any other 6502-based computer. The review concludes, "HES MON provides more than merely a window on machine language." Reader Service number 420.

(Reviewed in InfoWorld, June 20, 1983)

Graphic Master

System Requirements: Atari 400/800/1200 with 40K RAM; Basic cartridge; disk drive; joystick; a printer is optional

Manufacturer: Datasoft, Inc., 19519 Business Center Drive, Northridge, CA 91324

Price: \$39.95

Comments: "Graphic Master," the review defines, "turns your Atari into a machine capable of creating and displaying graphic designs." The program allows you to work on two independent hi-res graphics screens.

According to the review, Edit is "by far the most important mode," because it offers a variety of images and colors as well as the opportunity to rotate images, increase or decrease magnitude and skew the contents of the entire screen. The review summarizes that the program is "extremely useful for enhancing reports and for limited design work." Reader Service number 412.

(Reviewed in SoftSide, #41)

Multi Disk Catalog III

System Requirements: Apple II and IIe; at least one disk drive

Manufacturer: Sensible Software, Inc., 6619 Perham Drive, West Bloomfield, MI 48033

Price: \$25

Comments: This package is for "anyone who needs to assemble, sort, search and print lists of their [sic] disk files." The program is designed to alleviate loss of control over inventory.

Says the review, "It's almost like having an automated librarian take care of your inventory." The catalog creates a database of disk numbers and files under name, type and size. "At \$25, it will probably pay its own way in the first six months," according to the review. Reader Service number 402.

(Reviewed in Popular Computing, June 1983)

Shoebox

System Requirements: IBM PC; 64K RAM; one or two disk drives

Manufacturer: Atlantic Software, Techland Systems, 39 Carwall Ave., Mount Vernon, NY 10552

Price: \$195

Comments: Shoebox is an agenda management system that specializes in time-related information. Says the review, "Whatever you now have stuck on the wall or lying about your desk is a candidate for Shoebox storage."

The system supports two separate databases—reminders and appointments. It's possible to write a customized priority system, and Shoebox offers a password protection system with a coordinator feature for authority purposes. Reader Service number 405.

(Reviewed in Softalk for the IBM Personal Computer, July 1983)

Music Maker

System Requirements: Apple II or Apple II Plus; 48K RAM; ROM Applesoft; at least one disk drive

Manufacturer: Jim Baldridge, SubLogic, 713 Edgebrook Drive, Champaign, IL 61820

Price: \$29.95

Comments: Music Maker transcribes music into song files that are played through the computer's speakers, or as the review suggests, "you can realize much better sound quality by playing the music through a stereo system."

It's possible to step through the notes singly and tempo can be altered at any time. Should you so desire, your creation can change key in mid-tune, and the range of notes available is impressive. Reader Service number 409.

(Reviewed in Softalk, May 1983)

Painter Power

System Requirements: Apple II, II Plus or IIe; 48K RAM; Applesoft in ROM or a language card

Manufacturer: Micro Lab, 2310 Skokie Valley Road, Highland Park, IL 60035

Price: \$39.95

Comments: Painter Power uses hi-res graphics that allow the artist in everyone to produce paintings on a color screen. A budding Picasso can use either the keyboard, paddles or joystick to create a paintbrush. Brush speed, width and shape can be varied.

The program offers two modes and, according to the review, "The real power of Painter Power lies in the advanced mode." For those who are particularly successful, "masterpieces can be saved on disk for a future showing." Reader Service number 403.

(Reviewed in BYTE, May 1983)

Marathon

System Requirements: Atari with 16K RAM cassette or 24K RAM disk

Manufacturer: Educational Software, Inc., 4565 Cherrydale Ave., Soquel, CA 95073

Price: \$19.95

Comments: According to the review, Marathon departs from typical math drill programs by using both graphics and sound capabilities. Players advance runners across the screen by correctly selecting the answer to mathematical questions.

One or two players select addition, subtraction, multiplication, division or a combination of operations. The four levels of difficulty are walker, jogger, sprinter and Olympian. The review concludes, "Marathon can be put to good use in the classroom." Reader Service number 401.

(Reviewed in Compute!, June 1983)

Personal Editor

System Requirements: IBM PC; 64K RAM; one disk drive

Manufacturer: IBM Systems Products Division, PO Box 1328-C, Boca Raton, FL 33432

Price: \$100

Comments: According to the review, the Personal Editor is "a tool you can craft to suit your editing needs." The editor allows for program editing and simple word processing procedures. "Like a pre-fabricated house, Personal Editor comes with many parts you must fit together," including 29 cursor functions and an extra 12 which are left to personal discretion.

The Personal Editor is perfect for program editing because, as the review concludes, it "puts design of your editor's features in the best hands—your own." Reader Service number 421.

(Reviewed in PC World, June 1983)

CP/M Plus

System Requirements: 8080, 8085 or Z-80 system; 8-inch floppy disk

Manufacturer: Digital Research, PO Box 579, Pacific Grove, CA 93950

Price: \$350

Comments: CP/M Plus is the latest in the Digital series of CP/M systems and, as the review states, it "includes all the familiar features of its predecessor, but is much faster and more efficient."

The file system has been updated to include directory hashing and a Least Recently Used (LRU) buffering feature. CP/M Plus now includes automatic disk logging, which the review enthuses "may be its most significant selling point." Reader Service number 414.

(Reviewed in BYTE, July 1983)

Savvy

System Requirements: Apple II with 48K RAM; two disk drives

Manufacturer: Excalibur Technologies Corp., 800 Rio Grande Blvd., NW, 21 Mercado Plaza, Albuquerque, NM 87104

Price: \$950

Comments: The Savvy package is a new system that adapts itself almost endlessly to business and professional needs. States the review, "If you want simple applications that you can fine-tune with perhaps the most friendly English-like programming language to date, this package might be just the ticket." Savvy's advanced system of pattern recognition keys in on whole groups of words; it can even be used in a multitude of languages at the same time.

Savvy's saturation point has not yet been found, and according to the review, discrimination actually improves with the volume of information. Reader Service number 406.

(Reviewed in Popular Computing, May 1983)

Eliza

System Requirements: Apple II, IIe or III, IBM PC, Osborne 1 or other CP/M-based computers

Manufacturer: Artificial Intelligence Research Group, 921 North LaJolla Ave., Los Angeles, CA 90046

Price: \$45 including source file, or \$25 protected

Comments: Eliza, a program that converses in English, has had a prodigious reputation since it was developed at MIT, and now it's available for micros. Eliza is fun, shows off systems well and can be personalized but, as the review warns, some aficionados have fallen into the trap of using the program as therapy.

"Eliza works best with the area of feelings and beliefs." The program operates by responding to key words and phrases as well as grammatical constructions. Eliza performs well, but, as the review concludes, "If you think Eliza does therapy, you need to change therapists." Reader Service number 413.

(Reviewed in Popular Computing, July 1983)

Micro-Cookbook

System Requirements: Apple II Plus (with ROM Applesoft), or Apple IIe (with 80-column card), or IBM PC; 3.3 DOS or PC DOS; 48K RAM (or 64K RAM for IBM); a printer is helpful

Manufacturer: Virtual Combinations, PO Box 755, Rockport, MA 01966

Price: \$40

Comments: As the review observes, computerized recipes are difficult because "The kitchen counter top is not exactly the cleanest place to put a terminal." Micro-Cookbook offers a solution by including a screen dump in the program so that a portable copy can travel to the kitchen.

The program provides 156 recipes with room for additions, as well as shopping lists, storage hints and a customized ingredient list for any menu. The review says, "It is a rare pleasure to come across a program such as Micro-Cookbook that is both high-quality and inexpensive." Reader Service number 407.

(Reviewed in InfoWord, May 30, 1983)

Savvy's saturation point has not yet been found, and discrimination actually improves with the volume of information.

Milestone Rev. 1.09

System Requirements: Z-80 or 8080-based system; 80-by-24 video; CP/M 2.x; one double-density drive

Manufacturer: Digital Marketing for Organic Software, 2670 Cherry Lane, Walnut Creek, CA 94596

Price: \$295

Comments: Milestone is a project-management program that aids businesses with critical-path analysis. Versions of the Pascal program are also available for TRS-80 and Apple computers. Milestone is highly customized; according to the review, it "creates a project schedule for you after you define the critical events that lead to completion."

The program is interactive, includes an automatic calendar and offers several units of time to choose from. Milestone helps out businesses by "providing information on project completion, project cost, schedule performance and rescheduling impact." Reader Service number 415.

(Reviewed in InfoWorld, May 30, 1983)

Vedit 1.36

System Requirements: Z-80, 8080 or 8086 system; CP/M-80 or -86, or MS DOS; one disk drive

Manufacturer: CompuView Products, 1955 Pauline Blvd., Suite 200, Ann Arbor, MI 48103

Price: \$195 for 8086, and \$150 for Z-80, 8080

Comments: Vedit is an all-purpose text editor that depends on Visual and Command modes. The review explains, "Although Vedit is not a true word processor, it does have several features in the Visual mode that allow you to use it for limited word processing functions."

Command mode allows for several more functions, including the ability to combine several instructions. The size of the file edit ability is not dependent upon the amount of memory. The review concludes, "If anything, the advertising claims for this product are understated." Reader Service number 418.

(Reviewed in InfoWorld, May 16, 1983)

WINDOW

System Requirements: Apple II, II Plus or IIe; 48K RAM; one disk drive

Manufacturer: WINDOW, Inc., 469 Pleasant St., Watertown, MA 02172

Price: \$29.95 per issue, \$24.95 by mail

Comments: WINDOW is a new, educational magazine published entirely on disk and, observes the review, "Unlike other magazines, it has sound, dynamic graphics, a chance to try out reviewed programs and more." Each issue includes an educational feature program, a feature article, a database program and more.

WINDOW includes melodies to accompany articles and a reset system makes for easy browsing through the contents. WINDOW effectively demonstrates computers' instructional potential and, concludes the review, it "is a new medium; we all have an exciting new resource to look forward to." Reader Service number 419.

(Reviewed in Classroom Computer News, May-June, 1983)

The time it takes ABSTAT to function
is less than the time wasted
standing on line at a mainframe.

Nutritionist

System Requirements: IBM PC, DOS 1.1 or 2.0; 64K; one disk drive

Manufacturer: Laurie North, N-Squared Computing, 5318 Forest Ridge Road, Silverton, OR 97381

Price: \$145

Comments: The basic premise of Nutritionist is "to analyze daily consumption of vitamins, minerals, protein, calories and carbohydrates." The program's database, taken from the U.S. Department of Agriculture, covers 730 items. The base may be modified: addition, deletion and portion adjustment are all available.

Twenty-one different nutritional need types are profiled and it's possible to sort a diet by ingredients so that deficiencies and excesses can be spotted. As the review points out, "For those who must control sodium or cholesterol intake, this is a very valuable program." Reader Service number 411.

(Reviewed in Softalk for the IBM Personal Computer, June 1983)

Fancy Font

System Requirements: CP/M; 64K RAM; two disk drives (Osborne system needs six); Epson MX-80 with Grafrax; text editor or word processor

Manufacturer: SoftCraft, Inc., 8726 Sepulveda Blvd., Suite 1641, Los Angeles, CA 90045

Price: \$180

Comments: Of Fancy Font: A Personal Typesetter, this review lauds, "It's one piece of software that lives up to its name." The package allows you to use a variety of type fonts as well as create new fonts. Fancy Font includes 30 fonts, four main type styles, various points and ranges and bold or italic selection.

Formatting codes are easily remembered so that changing fonts in the middle of a file is simple. "The package," says the review, "is very easy to install and relatively easy to run; it lives up to everything the manufacturer has claimed about it." Reader Service number 416.

(Reviewed in InfoWorld, May 2, 1983)

ABSTAT 2.2

System Requirements: a CP/M system; 56K RAM; 240K disk storage; 80-column terminal

Manufacturer: Anderson Bell Co., 5336 South Crocker St., Littleton, CO 80120

Price: \$395

Comments: ABSTAT is a statistical program for CP/M systems that, according to the review, "could well serve as a replacement for the mainframe computer for some data analysts." ABSTAT allows you to enter, edit, transform and analyze data. The review states that the best aspect of the program is that it can run statistical procedures and produce reports interactively.

Package functions include correlation, regression analysis and graphing abilities. The review opines that the time it takes ABSTAT to function is less than the time wasted standing on line at a mainframe. The reviewer concludes, ABSTAT "works as well as any program I've ever run, if not better." Reader Service number 417.

(Reviewed in InfoWorld, June 6, 1983)

BYTE Publications, Inc., 70 Main St., Peterborough, NH 03458

Classroom Computer News, published by Intentional Educations, Inc., 341 Mt. Auburn St., Watertown, MA 02172

Compute!, published by Small Systems Services, Inc., PO Box 5406, Greensboro, NC 27403

InfoWorld, published by Popular Computing, Inc., 375 Cochituate Road, Box 880, Framingham, MA 01701

PC World, published by PC World Communications, Inc., 555 DeHaro St., San Francisco, CA 94107

Popular Computing, published by BYTE Publications, Inc., 70 Main St., Peterborough, NH 03458

Softalk and Softalk for the IBM Personal Computer, 11160 McCormick St., North Hollywood, CA 91604

Softside, published by Softside Publications, Inc., 6 South St., Milford, NH 03055

Table. Addresses of the magazines publishing the software reviews digested in this department.

Bulk Mailer

System Requirements: Apple II or II Plus; 48K RAM; ROM Applesoft; at least one disk drive

Manufacturer: Joe Marinello, Satori Software, 5507 Woodlawn North, Seattle, WA 98103

Price: \$125 (floppy); \$350 (hard)

Comments: Bulk Mailer is a program designed to do one task and one task only: manage a mailing list. According to the review, Bulk Mailer accomplishes this task and "is both a technological and functional advance for the Apple II." Contrary to conventional belief, the system can handle very large quantities of data efficiently.

Amazingly, the program can handle "32 thousand names and retrieve any one of them in approximately two seconds." It has a filtering system for only partial orders and keeps a zip code inventory. Concludes the review, "Versatility be damned! Get me that record in two seconds." Reader Service number 410.

(Reviewed in Softalk, June 1983)

Medman

System Requirements: IBM PC; 64K RAM; one or two disk drives

Manufacturer: Galleria Micro Systems, 5085 Westheimer, Suite 4700, Houston, TX 77056

Price: \$5000

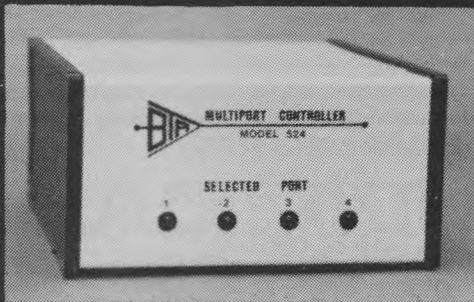
Comments: Medman is a medical office management system that covers every aspect of current health care. According to the review, Medman is best suited for a hard disk system because it has the capability to handle records for thousands of doctors simultaneously.

The program handles billing, including third party and insurance, appointments, diagnoses and procedures. The program calls up information with the use of initial letters, which is a time-saver, and there is a built-in security system. Reader Service number 404.

(Reviewed in Softalk for the IBM Personal Computer, July 1983)

Circle 131 on Reader Service card.

Need More Serial Ports ?



Price
\$249.00

Bay Technical Associates

P. O. Box 387, Bay St. Louis, MS. 39520

601 - 467-8231

- ★ Add a BTA smart multiport controller to your C.P.U.
- ★ The **MODEL 524** expands a single RS232 port to four individual ports with port selection and baud rate controlled by user software.
- ★ Buffered inputs permit simultaneous operation increasing data exchange rate.
- ★ 62K spooler model also available.

Circle 318 on Reader Service card.

The Modem that Delivers 3 Ways



1. Low \$189 Price. TNW's Operator-103™ provides full auto-dial and auto-answer capabilities for only \$189. This is an attractively packaged Bell-103 compatible 110 to 300 bit per second modem, delivered complete with documentation and full one-year warranty.

2. Ease of Use. Operator's commands are easy to remember, like "Dial," "Answer," and "Hangup!" And they're easy to enter — you type only the first letter of the command, and Operator echoes the full command word. Type "?" and Operator lists your command options.

3. High LSI Performance/Reliability. Operator-103 is built around the TI 99532 modem IC, which means fewer errors on marginal telephone lines and reduced chance of modem failure.

TNW
CORPORATION

3444 Hancock Street
San Diego, CA 92110

Phone (619) 296-2115
Telex II 910-335-1194

CALENDAR

INTECH '83—Chicago

INTECH '83, a conference focusing on integration of office information systems, will take place November 1-3 in Chicago's McCormick Place. For more information, call 800-638-8510 or 301-459-8383.

New England Computer Show

The New England Computer Show and Sale will take place November 3-6 at the Centrum in Worcester, MA. The show will include displays and demonstrations of the latest business and personal hardware, software and peripherals.

For more information, call 617-366-1476.

ISII Conference—Kansas

The International Society for Individualized Instruction will hold its annual conference November 4-6 at Doubletree Inn in Overland Park, KS. The conference is entitled Individualized Instruction in the Eighties: Learning with Computers.

For further information, call 913-749-4380.

San Diego Society Fair

The San Diego Computer Society will present its fourth annual fair November 5 and 6 at the Scottish Rite Center, 1895 Camino del Rio South, in San Diego's Mission Valley.

The fair will feature technical sessions, programming and computer game contests and displays by user groups. For more details, call 619-565-8720.

ICC in the Lonestar State

The Invitational Computer Conference continues its series in November with two dates in Texas: November 8 at Adam's Mark Hotel in Houston and November 10 at the Sheraton Park Central Hotel in Dallas.

The ICCs are one-day, by-invitation-only conferences directed to a specific audience of volume buyers. More information is available from Susan Fitzgerald, B.J. Johnson and Associates, 3151 Airway Ave., #C-2, Costa Mesa, CA 92626; 714-957-0171.

London SOFTWARE/expo

Wembley Conference Centre in London will host the third annual SOFTWARE/expo on November 8-10. The expo is the United Kingdom's only opportunity for software vendors to meet professional users.

This year's conference will focus on new developments and the latest in packaged software will be on display. For further information, write to SOFTWARE/expo, 222 West Adams, Suite 400, Chicago, IL 60606, or call 312-263-3131.

Mini/Micro Hits the West Coast

Brooks Hall in San Francisco is the site of the West Coast edi-

tion of Mini/Micro. Wescon/83 High Technology Electronics Exhibition and Convention will also be in town at the Moscone Center and Civic Auditorium. Both shows are scheduled for November 8-11.

More information can be obtained from Jerry Fossler at 213-772-2965.

Public Course offerings

Ken Orr and Associates, Inc. of Topeka, KS, is offering two public course in November. Structured Requirements Definition is slated for November 15-18 in San Antonio, TX, and a combined course covering Structured Systems Design and Structured Program Design will be held November 28 through December 2 in Atlanta, GA.

More information can be obtained from Georganna Carson, Ken Orr and Associates, Inc., 1725 Gage Blvd., Topeka, KS 66604; 800-255-2549, or in Kansas, 913-273-0653.

Alabama Micro-Show

Micro-Show '83 will be held November 18 and 19 on the campus of Enterprise State Junior College. The show looks to be the largest collection of hardware, software and supplies ever displayed in Alabama.

For information, contact Bill Brown, Chairman, Division of Computer Information Science, Enterprise State Junior College, Enterprise, AL 36630; 205-247-2623.

Micros in Education, OK

The third annual conference on Microcomputers in Education will be held November 18 and 19 at Oklahoma State University. Various educators will present papers on a wide variety of topics.

In addition, participants may examine currently available microcomputer hardware and software. Contact Dr. Douglas Aichele for further information at Oklahoma State University, 302 Gundersen, Stillwater, OK 74078.

Northeast Show—Boston

The fifth annual Northeast Computer Show and Software Exposition will be held November 17-19 in Boston's Hynes Auditorium. The show is the largest annual end-user computer event in the East.

For more information, call 800-841-7000 or, from within Massachusetts, 617-739-2000.

"In the Land of 10,000 Computers"—Minnesota

MECC, the Minnesota Educational Computing Consortium, will hold its second national conference November 18-22 in Bloomington, MN. A general conference, entitled "In the Land of 10,000 Computers," on November 21 and 22, will discuss the use of computers in schools. Pre-conference workshops will also be offered.

For information, call the MECC '83 Hotline: 612-638-0683.

Calendar continued.

On-Farm Computers—Indiana

Purdue University will host the third annual On-Farm Computer Use Conference and Trade Show on November 20-22. The conference will cover computer aspects that interest both experienced computer users and novices alike.

New innovations will be highlighted at the Trade Show, and diverse aspects of agri-business computer use will be discussed. More information can be had from Stephen Resch at 317-494-2755.

Computer Exhibition—Dubai

The third Gulf Computer Exhibition on the Persian Gulf will be held November 21-24 in Dubai, United Arab Emirates. The conference is the only show in the Gulf designed for companies in the computer industry. Users, buyers and suppliers from all of the Gulf nations are expected to attend.

For more information, contact MABCO, Inc., 739 Boylston St., Suite 308, Boston, MA 02116; 617-536-3442.

Southeast Show—Atlanta

The Southeast Computer Show and Office Equipment Expositions will be held December 8-11 in Atlanta, GA. The third annual Conference will offer free public seminars at each show to elaborate on various computer applications.

More information can be obtained from Computer Expositions, Inc., PO Box 3315, Annapolis, MD 21403; 800-368-2066 or, from within Maryland, 800-492-0192.



CLASSIFIEDS

Classified advertisements are intended for use by persons desiring to buy, sell or trade used computer equipment. No commercial ads are accepted.

Two sizes of ads are available. The \$5 box allows up to 5 lines of about 35 characters per line, including spaces and punctuation. The \$10 box allows up to 10 lines. Minimize use of capital letters to save space. No special layouts allowed. Payment is required in advance with ad copy. We cannot bill or accept credit.

Advertising text and payment must reach us 60 days in advance of publication (i.e., copy for March issue, mailed in February, must be here by Jan. 1). The publisher reserves the right to refuse questionable or inapplicable advertisements. Mail copy with payment to **Classified Microcomputing**, Peterborough, NH 03458. Do not include any other material with your ads as it may be delayed.

The Egyptian Management Information Center, 93 Kasr Eleiny St., Cairo, Egypt, Phone 27525, Telex 92185 (Hapi Un), is looking for interested manufacturers to market their hardware and software in Egypt and the Middle East. Contact Adel Fahmy, Ph.D.

Kilobaud Microcomputing, Issues # to #41, except #2. Best offer to Jim Kennington, PO Box 769, Hollywood, CA 90078. Phone 213-761-5962, PST 6 PM to 9 PM.

DEALER DIRECTORY

Woodbridge, CT

RIP-SOFT! New game spoofs computer bizz. Break the 'calc habit—IBM PC software—See how—Open Basic—Program catalog—Programmer's toolbox—Utilities and fun. People Systems, Ltd., 78 Maplevalle Drive, Woodbridge, CT 06525; 393-3913.

Aurora, IL

Full line of Apple Computer and Fortune Computer, Hewlett-Packard Personal Computers, Calculators and Supplies. IDS Prism, SMC and Daisywriter Printers. Farnsworth Computer Center, 1891 North Farnsworth Ave., Aurora, IL 60505 (851-3888) and 383 East North Ave., Villa Park, IL 60181 (833-7100).

Nokomis, FL

We are the leading area computer store. We carry Cromemco, Apple, Vector Graphic; printers and terminals. We offer full software support including G/L, A/R, payroll and word processing. Computer Centre, 909 S. Tamiami Trail, PO Box 130, Nokomis, FL 33555. 484-0421.

Aurora, IL

DYSAN Diskettes, Authorized Dealer. We also supply many name brand computers, terminals, printers, software & accessories. All at discount. Call for pricing. Fox Valley Computer Systems, Sales Order Dept., 1745 Jericho Road, Aurora, IL 60506; 859-0304.

**"AUTHOR
AUTHOR!"**

The call for authors is out!

Wayne Green Books announces a December 31, 1983 deadline for submitting manuscript proposals for the upcoming publication list. Ideas for book-length manuscripts about any microcomputer system or area of electronics will be considered. In addition to payment and royalties, we offer our distribution channels and the marketing support your book deserves.

Send proposals or requests for a copy of our Writer's Guide to:

Editor, **Wayne Green Books**

Peterborough, NH 03458.

Or call **toll-free 1-800-343-0728**.

Dealers: Listings are \$15 per month in prepaid quarterly payments, or one yearly payment of \$150, also prepaid. Ads include 25 words describing your products and services plus your company name, address and phone. (No area codes or merchandise prices, please.) Call Marcia at 603-924-9471 or write *Microcomputing*, Ad Department, Peterborough, NH 03458.

An Attempt at Teaching Apple Basics A Text to Test Tech History Buffs Looking Inside Microcomputers Tips for IBM, ZX-81 Programmers

The Easy Guide To Your Apple II

Joseph Kascmer
Sybex, 1983
2344 Sixth St.
Berkeley, CA 94710
Paperback, 147 pp., \$9.95

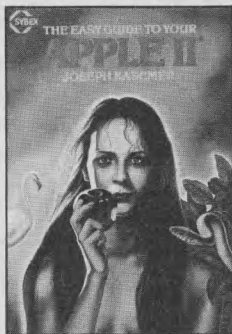
First of all, you can't judge this book by its cover. I've had *The Easy Guide to Your Apple II* around for about a month now and I still don't understand the message.

If you try to evaluate it based on what's printed on the back of the book, however, you have to judge that it only partly meets its goals.

For instance, author Joseph Kascmer promises that you'll learn to "make forecasts and simulations" quickly. The example for this is a simple seven-line program to tell you that if you start with \$2200 in your savings account and add \$355 each month, you'll accumulate \$5395 after nine months. It's the *basis* for a more complex project, to be sure, but the example is so simple that it doesn't nearly provide the help it should.

You're also told you'll learn how to "expand your system with useful accessories," but this amounts to only three pages at the end of the book.

You're promised you'll be able to "customize prerecorded programs to your needs." No, this doesn't let you get inside of and change Apple Writer II or VisiCalc; the only example of this is a line change or two in the Make Text and Retrieve Text programs that are on your DOS 3.3 Master Disk.



It seems that Kascmer tried to simplify things so much that, while each idea is touched on, little is explained in enough detail to instruct the reader adequately. Kascmer has worked hard to keep his writing clear and lucid, and to keep his explanations in line with his title; therein lies the weakness of this book.

You can't judge this book by its cover.

Chapter 1 is a nine-page section that covers the basics—what the keyboard looks like, what the keys mean and so on. Chapter 5 covers the disk operating system (DOS), and chapter 7 touches on machine language and has pictures of the inside of the Apple II Plus and the IIe.

The other 100 pages of this 147-page book amount to an instruction manual for the Basic programming language. So while Kascmer calls it *The Easy Guide to Your Apple II*, he seems to run out of things to cover along that line, so he's forced to spend most of the space on an effort to instruct you how to program in Basic.

It's hard to criticize what Kascmer does here, for he touches on just about every Basic command and function. However, it's difficult to teach the language in only 100 pages.

The situation is aggravated by what seems to be an effort to dress up the little programs to make them more fun to use, and thus make it easier to learn Basic. While the idea has some merit, you often end up with a lot of flashing characters, words that appear at various rates of speed and a lot of control-G commands that tell your Apple to beep. In one case, where you want a program simply to print the answer to a problem with "Value Below Two," you're told to write this line:

100 PRINT TAB (20) "(press CONTROL-G)(press CONTROL-G)(press CONTROL-G) VALUE BELOW TWO"

While it's instructive to see what the tab function does, does the user really need the line to say BEEP! BEEP! BEEP! "VALUE BELOW TWO"?

The coverage of graphics is good for both the low- and high-resolution screens with text below, and you learn how to draw a few grids and lines, arrows and a star. There are no charts that show which numbers draw in which colors.

On the positive side, Kascmer is knowledgeable, clear and more than concise. Variables are explained well, and some readers might like their instructions with all of the extraneous detail, like Tab and Inverse and Beep! The if/then command is covered well, and the details on the keyboard are helpful. There is a list of special-purpose commands, a glossary and a brief list of other books of interest.

It seems to me that *The Easy Guide to Your Apple II* makes an effort to be all things to all people, but it ends up in a form that serves few. The volume should either be expanded (and titled) as a programming guide with sufficient space to explain the Basic language, or shrunk a bit to cover only the *how* of using your Apple.

Greg Glau
Prescott, AZ

A History of Computing In the Twentieth Century

Edited by N. Metropolis,
J. Howlett and Gian-Carlo Rota
Academic Press, Inc., 1983
111 Fifth Ave.
New York, NY 10003
Hardcover, 650 pp., \$32.50

After several years of working with microcomputers and mainframes, I must admit to a growing interest in the history of the technology of these machines. As I

write this, I'm seated before my six-year-old Heathkit H8, which many consider almost obsolete. The MITS Altair, which preceded the H8 by a year and marked the beginning of the personal computer age, is also almost obsolete.

These machines represent more raw computing power than could be bought for any amount of money 40 years ago. Thirty years ago, their equivalents would have cost millions to build and install, and additional millions to rent and operate. Even 15 years ago, my Heathkit's power and ease of application would have cost hundreds of thousands of dollars to copy, and even then there would have been features that couldn't have been duplicated completely.

So how did we get here? Who's responsible for the virtual miracle that takes place when we call up WordStar or Space Invaders? Few know, and I think that's a shame.

If you agree that these are important or interesting questions, then *A History of Computing in the Twentieth Century* is a must for your reading list.

The book is divided into five broad categories. Part 1 is a general introduction best summed up by the leading article, "We Would Know What They Thought When They Did It," by R.W. Hamming. Best known for the Hamming Code, an important error-correcting technique, Hamming sets the tone for the articles that follow his own.

Hamming is joined in this introductory section by the late Kenneth May, who makes the point that the development of computers ranks as one of the 20 most significant events in the history of mathematics. I think May may have erred on the conservative side; a close reading of the rest of the book suggests that the development of the computer probably ranks in the top 20 most significant events in the history of the world. But that's for you to decide after reading this book.

Part 2 is the most interesting; it deals with the human side of computer development.

Two articles stand out—the ones discussing the pioneering work done at a place called Bletchley, England, during the second World War. If you haven't heard of Bletchley, don't feel too left out; until quite recently, the things accomplished there were considered "Most Secret by H.M. Government," and were only alluded to, almost in passing. Nevertheless, what happened there, and the people who did the work, had a great influence on world history.

The Enigma saga had its roots at Bletchley, and the whole development of computers was affected by the code-breaking work done in that connection. The machine that did the work was called Colossus, and two of computing's leading historians tell the story in two articles.

There are other articles, of course; one of the most interesting deals with the late John von Neumann and his role in shaping the development of computer architecture.

B.B. (Before Basic)

Part 3 covers the development of programming languages. The constellation of computer languages is a large one, and can hardly be covered in 100 pages or

***A History of Computing in the Twentieth Century* is an important addition to the computerist's library.**

less, but one outstanding effort to summarize what went on before Kemeny and Kurtz invented Basic is the article by Donald E. Knuth and Luis Trabb Pardo, "The Early Development of Programming Languages."

If you have an interest in languages, this classic article covers about 20 languages, and the same test program (the famed "TPK Algorithm") is written in each language to make comparisons easy. After reading that article and coding the TPK Algorithm in Basic, I can admit to unbounded admiration for the early programmers who were stuck with Zuse's Planicalculus of 1945 or Grace Hopper's A-2 of 1953.

Part 4 brings us to a consideration of the machines themselves.

Some may object to the thesis that computers are a 20th century invention, and that work going back at least as far as Pascal should be considered. I agree that the foundations of computing go back at least that far, but the machines we know as computers today really are 20th century inventions, as this section makes clear.

The step from mechanical to electronic computer was taken in this century; it's difficult to picture a game of Asteroids on Babbages' analytical engine. Sixteen views of the early machines are presented, along with the problems the designers faced, the trade-offs that had to be made and the growing pains of a new technology.

Who's Zuse?

The last section, part 5, is largely a collection of reminiscences of those who "were present at the creation." They include the recollections of such figures as

Eckert and Mauchly, Dijkstra, Svoboda and Zuse, and a new and expanded version of Brian Randell's excellent bibliography on the origins of digital computers.

While *A History of Computing in the Twentieth Century* is somewhat heavy-going in places and rather technical at times—and certainly not for everyone—I recommend it to anyone who wants to know how we got where we are today and who made the major contributions.

It's hardly necessary to read this book to appreciate SuperCalc or to play Micro-Chess, but the true craftsman knows his tool thoroughly, and for that, this book is an important addition to the computerist's library.

**D.C. Shoemaker
APO, NY**

Microcomputers

A.J. Dirksen
TAB Books, Inc., 1982
Blue Ridge Summit, PA 17214
Softcover, 231 pp., \$11.95
Hardcover, \$17.95

One of the most appealing features of today's microcomputer is that you don't need to know much about the inner workings of the machine. You're free to concentrate on the problems to be solved with the machine, rather than how the computer affects the solution.

However, a user without a technical background in computer design occasionally gets bitten by the bug of curiosity. Where does this person turn to learn what happens inside the microcomputer?

Enrolling in a college-level computer class involves considerable expenditure and entails some emotional stress (who ever liked tests?). Continuing to read *Microcomputing* and other magazines, hoping to glean bits (pardon me) and pieces of knowledge from diverse articles, doesn't ensure that you'll acquire complete knowledge in a timely fashion. Fortunately, loads of books on the subject are available.

Microcomputers, from TAB Books, is one example. It includes chapters on the fundamentals: various number bases, binary arithmetic and Boolean algebra. The reader will learn to tell RAM from ROM, and he'll see how timing diagrams help describe the operations involved in executing each instruction. It also covers addressing techniques and discusses assembly instructions.

While *Microcomputers* is a useful publication, compare it to *Introduction to Microcomputers, Vol. 1, Basic Concepts* (Osborne/McGraw-Hill, 1980). With much the same material between the covers of these books, you might expect them to be similar, right? Wrong! The Osborne book is a Cadillac compared to the Chevrolet offer-

ing from TAB. Please note that I don't think this A.J. Dirksen book is bad: a Chevrolet will get you to the same destination as the Cadillac, but the Cadillac does it with style.

Much of what is wrong with Dirksen's offering stems from the fact that the book was first published back in 1978 in Dutch.

A good deal of *Microcomputers* is devoted to programming microprocessors using Teletype machines, which generate a punched paper tape before reading the instructions into the microprocessor from tape. This practice may have been commonplace when the book was written; however, today's users have more modern equipment at their disposal.

The illustrations contained in *Microcomputers* are not all crisply printed, and some suffer from residual Dutch labels, or what appear to be hurriedly scribbled corrections. The instruction set discussed in this book pertains to the 8080 microprocessor, which is not in current production.

Nevertheless, the techniques discussed are applicable to any microcomputer. And to the book's credit, the translation generally reads well.

Justin Crom
Denver, CO

Inside the IBM PC: Access to Advanced Features And Programming

Peter Norton
Robert J. Brady Co., 1983
Routes 450 & 197
Bowie, MD 20715
Softcover, 262 pp., \$19.95

The Heisenberg Uncertainty Principle states that an electron cannot be located exactly in terms of both its space and momentum coordinates.

In one sense, this principle should be understood by any microcomputer book reader. This is especially true for books that are written for systems like the IBM PC. Peter Norton's new book, *Inside the IBM PC*, makes a good attempt at hitting a moving target.

Norton, who is widely known for his software, "The Norton Utilities," has gone beyond the mass of beginning and introductory offerings that are flooding the market and written a book for the intermediate and advanced user of the IBM PC.

It's Not Too Cloudy

Because the title suggests that the book is written for programmers, the casual user or beginner should not think the subject matter is extremely complex or clouded by jargon overuse. It truly includes something for everybody.

A central theme carried throughout the book is the application of Norton's technique and method, not only to the IBM PC but also to look-a-likes and other systems running MS DOS. He uses the "three circles of interest" concept and makes crossover suggestions that apply to these different systems. This is an interesting approach, and because of the recent introductions of many "compatibles," a wider audience naturally will be

Whether you use your system for business, at home or to write programs for the IBM PC, you'll benefit from *Inside the IBM PC.*

gained. Since there is no explicit mention of these other computers, it is the responsibility of the reader to know if any particular part applies to his system.

Inside the IBM PC falls squarely between IBM's *Guide to Operations* and technical reference manual. In fact, to fully understand and to make the most of the book, the reader should either have access to or be familiar with both manuals.

In addition, a group of programs to supplement *Inside the IBM PC* can be obtained for \$65. Titled "Programming Access Tools To Accompany *Inside the IBM PC*," this three-disk software package is designed for those who have little interest in "keyboning" the listed programs and examples, of which there are many. A summary of the disk programs is included as appendix 5.

Norton has played, voluntarily or involuntarily, a part in an ongoing industry controversy. From the disclaimer that appears in the beginning of the book ("The author and publisher make no warranty of any kind, expressed or implied, with regard to these programs or the documentation contained in this book"), it becomes difficult to decide whether it was written to support the disks or the disks made to support the book.

The disclaimer is included for good reason—there are numerous errors.

Perhaps the most serious is the inclusion of the phrase "Includes DOS 2.0" on the back cover. Any mention of DOS 2.0 is so perfunctory that you wonder why, except for tease, it would even be included. The suggestion that the subject will be included in future printings brings to mind the noticeable trend that publishers are rushing to the printing

press—in the same way that software vendors are mass-producing incomplete products. We grow accustomed to waiting for future releases that correct rather than enhance.

If the reader can get past these inconveniences, he'll reap a veritable plethora of tricks and techniques that can be quickly applied to enhance his use of the IBM PC or compatible system. For this reason, *Inside the IBM PC* is a welcome addition to the growing library of support material available today.

Uncloaking ROM and RAM

What Peter Norton writes best about is the uncloaking of the mysteries of ROM and RAM. Included in the book is a routine for verifying the existence of the date stamps that are a part of the IBM ROMBIOS. His explanation of an easy-access method to this piece of information is a useful introduction to the use of the DOS Debug utility program included on all IBM DOS disks.

By using *Inside the IBM PC* as a road-map, many of you not-too-adventurous types may feel comfortable doing some digging into areas that you would never have dared to before Norton's book. This is the kind of activity he encourages, as long as the user has some idea of what he is doing and takes precautions not to start probing and dissecting a master copy of an expensive applications program.

A thorough explanation of disks and how information is stored is also provided. This can be a confusing subject, but Norton presents the elements in a clear and concise manner. Some of the secrets of copy protection are discussed, and software authors will find included methodologies they may wish to incorporate in their protection schemes.

It's well worth the reader's time and effort to get and study this book. Whether you use your system for business, at home, or to write programs for the IBM PC, you'll benefit from *Inside the IBM PC*.

F.T. Switzer
Fort Wayne, IN

Mastering Machine Code On Your ZX-81

Toni Baker
Reston, 1982
11480 Sunset Hills Road
Reston, VA 22090
Paperback, 200 pp., \$12.95

Anyone wishing to realize the full potential of the T/S 1000/ZX-81 will want to consider devoting some time to learning machine code programming. For novice programmers who presumably comprise the majority of T/S 1000 users, Toni Baker's *Mastering Machine Code on*

Your ZX-81 is almost the only game in town.

According to the book's cover, it's "comprehensive, yet easy-to-understand," and leads the programmer "gently from the Basic language into ZX-81 machine code." *Mastering Machine Code on Your ZX-81* is indeed comprehensive, beginning with an introduction to binary and hexadecimal numbers and ending with chapters on disassembling ROM and arithmetic subroutines. However, no novice who survives this book from beginning to end would ever describe the journey as "gentle."

The least of the book's shortcomings is its terrible print, which appears to be a photocopy of the original typed manuscript. More annoying to the reader are the numerous errata and lacunae sprinkled generously throughout the 200 pages. This is the result of poor or nonexistent editing, and one would hope that in subsequent editions Reston will seek to eliminate these flaws in an otherwise excellent book.

At twice the price, *Mastering Machine Code on Your ZX-81* would still be a bargain. Its 17 chapters and appendixes are crammed with a fortune of information, including a machine code loader/editor, which itself is written mostly in Z-80 machine language.

The program is called HEXLD3, and, once loaded, it can be used to write, edit, delete, save and list machine language programs. Both the Basic and the machine code parts of HEXLD3 are listed in appendix 1, which is fortunate, since one of the routines (Begin) is missing from the chapter devoted to the creation of this program. There are also discrepancies between the listing of HEXLD3 in the appendix and that given in chapter 9.

Several chapters of *Mastering Machine Code* are devoted to programs that entertain while illustrating important uses of Z-80 machine language.

Of particular interest is an introduction to computer music. This short program allows the user to play two full octaves of notes, including flats and sharps, through the sound system of the television set. (An unexpected result of running this program was that I received four or five radio stations by adjusting my tuning knob.) This entertaining routine can be stored in a REM statement with only 70 characters.

Also noteworthy are the programs Life, which duplicates the multiplication of cells, and Spirals, an introduction to writing games with moving graphics. The reader should be aware that the data listing for Spirals contains two errors. Fortunately, they are easily detected and corrected.

Mastering Machine Code on Your ZX-81 is a book that is easy to love, even with its shortcomings. It's not an easy book, but programming in Z-80 machine language isn't an easy task, especially for

the novice. To go through this book requires concentration and, in places, huge mental leaps. But the results and Baker's engaging style of writing make it worthwhile.

John Aldridge
Falls Church, VA

Write, Edit, & Print

Donald H. McCunn
Design Enterprises of San Francisco,
1982
PO Box 14695
San Francisco, CA 94114
Hardcover, 528 pp., \$34.95
Softcover, \$24.95

Write, Edit, & Print, with its massive 527-page size, covers all you need to know about word processing—and then some. Written in simple language that even I understand, it contains a wealth of information on computers and peripherals, programming, and of course, word processing. At \$34.95 (hardback) or \$24.95 (paperback), it's a bargain.

Author Donald H. McCunn recognizes that there is no shortage of "canned" word processing programs on the market for most popular microcomputers, but he maintains that users seldom find these programs quite right for their needs. The ideal word processor, obviously, is one that is tailored to the needs of its user.

Write, Edit, & Print offers four programs written in Basic, with conversion information for the Apple II, IBM PC, and TRS-80 (Models I, II and III), as well as other computers that use Basic-80 under CP/M. These programs are:

- The Basic Word Processing Program
- The Extended Writing Program
- The Extended Printing Program
- The Editing Program

I entered these on my Apple II and found that they work (for the Apple, at least). You'll have to check for yourselves on the other machines.

I've been casting about for the "perfect" word processor for a long time, and I've probably spent more money than I should on a variety of canned programs—Super-Text II, Super-Text 40/80, Magic Window, Zardax and WordStar. Although none of these programs fits my needs *exactly*, they all give me such an advantage over the most expensive typewriter that I would be satisfied with any one of them if it were the only one available.

If you're using your computer as a business tool, can you afford the time required to code and debug your own word processor, even if you have the listing to work from?

The most expensive of the programs cited above—WordStar—costs about \$500 without discounts. At \$25 per hour, for example, your break-even point for "roll-

ing your own" is 20 hours. It took me a lot more than that to get these programs up and running. And although WordStar is not my favorite WP program, I found that it fit my needs more closely than did these programs.

On the other hand, a hobbyist who can afford the time to build these programs and cannot justify the cost of available canned ones will find this book a real boon. It will teach him programming techniques that will be valuable for a wide variety of projects, and when he's finished, he'll have a useful word processor.

The author recognizes this dilemma on the last page of the book, where he offers the program on disk for \$29.95. This is the way to go if you're on a low budget and don't have the time for programming.

The book discusses a number of popular microcomputers on the basis of how well they lend themselves to word processing. It provides solid advice on how to evaluate a micro for this or any other purpose—keyboard and screen characteristics, memory capacity, storage devices, expansion capability, documentation, availability of quality maintenance and manufacturer reliability—and it discusses a number of machines in these terms. It's probably worth the price for this information alone if you haven't yet made your computer purchase.

The chapter on printers is equally thorough, discussing dot matrix and letter-quality printers in general and including specific information about several printers in both categories.

Section 2 of *Write, Edit, & Print* is divided into two chapters—"Standard Basic Instructions" and "Basic Instructions Requiring Conversion." The former talks only about the elements of Basic that are used in the word processing program. This is too bad, for if McCunn had expanded it to include all of Basic, he would have had an excellent stand-alone book on the subject.

In the chapter "Basic Instructions Requiring Conversion," the author discusses how various functions are written for the different machines covered. This is good information for anyone wanting to convert a Basic program from one computer to another.

Write, Edit, & Print is a massive effort and well-done. My only criticism is that it may be slanted toward the wrong audience. If you're simply looking for a word processing tool, you'd do well to look over the market, compare features and prices and buy the one that looks best for you. But if you want to really learn about how to choose hardware for word processing, the differences in Basic, how to program in Basic and what's required for good word processing software, then *Write, Edit, & Print* is the book for you.

David C. Goodfellow
Seattle, WA

Reports By Example

Solutions By Example, Inc., announces the release of Reports By Example, an easy-to-use report writer for spreadsheets on the IBM Personal Computer.

This new software offers a solid advance in the technology because commands are simple and users can operate the program without using the keyboard. It formats spreadsheet output into a professional report.

Reports By Example is the first full function report generator for spreadsheets that provides 100 percent control over the format of cells, rows, columns, and pages of a report.

On-line explanation files are available for each of the 24 different situations users face with the product. Users can begin operation quickly because the instruction sheet is only one page.

The product supports more than 25 types of printers, including such names as IBM, Epson and Okidata. Reports By Example is capable of using the font, type size, and print quality features of the printer on a cell-by-cell basis. This detailed level of printer control eliminates the need for learning obscure printer codes.

Reports By Example is currently available for VisiCalc and 1-2-3. Hardware compatibility and requirements for this product are an IBM PC or IBM PC-XT, minimum of 128K memory, minimum of two disk drives, monochrome or color display, DOS 1.1 or 2.0.

Reports By Example costs \$199. Solutions By Example, Inc., Box 307, New Town Branch, Boston, MA 02258. Reader Service number 494.

Relay

VM Personal Computing, Inc., announces the most comprehensive communica-

tions software package available for the IBM Personal Computer.

Called Relay, the package offers the ability to send and receive messages or files simultaneously between IBM PCs while printing and editing locally. It also communicates with mainframe hosts, uploads and downloads data and operates as an APL terminal.

In addition to superior PC to PC communication, Relay enables users to expand the communication capabilities of the IBM PC. Relay allows the PC access to a variety of computer service bureaus, including Dow Jones, CompuServe and the Source. It also allows communication and data transfer between PCs and corporate mainframes, or most dial-up computers.

Relay can be used to access a service bureau or communicate with host computers. It also has the ability to turn the PC into an APL terminal with the push of one key.

Relay has several features including an on-screen Help facility that answers questions quickly without losing work in progress; a directory that stores telephone numbers and special characteristics of frequently accessed computers; and a completely menu driven system.

Relay sells for \$149. VM Personal Computing, Inc., 60 East 42nd St., New York, NY 10165. Reader Service number 493.

Sprint Typer

Sprint Typer, an educational/tutorial typing program for the Commodore VIC-20 microcomputer, has just been introduced by Computer Software Associates.

Sprint Typer is a cassette-loaded program written for an unexpanded VIC-20. It was designed primarily for the novice computer user who wants to get beyond games or

for the person who wants to upgrade his or her typing skills.

Sprint Typer is a typing tutorial program that lets you teach yourself touch typing and easy programming on the VIC-20 by providing easy sentences that appear in random sequence. One hundred five words and eight digits are used to compose 356,625 different sentences in eight basic statement structures.

The program generates a sentence, which you then type. You are timed for speed, and the computer tells you the number of errors in the sentence. The computer also indicates your fastest time during a given session. When the sentence is typed perfectly, you will be given another sample to type.

Sprint Typer sells for \$19.95. Micro Software International, Inc., 44 Oak St., The Silk Mill, Newton Upper Falls, MA 02164. Reader Service number 492.

VisiCalc

VisiCalc Tutorial is a new software product by Shaffer and Shaffer Applied Research and Development, Inc.

The self-instructional disk and guide allows new users to master the VisiCalc electronic spreadsheet in a matter of hours rather than the three-to-five-days normally required.

The software interacts directly with the VisiCalc program to teach its use. A series of exercises provide immediate hands-on experience from basics to advanced functions and builds a working Profit Analysis model. A self-pacing Checkpoint system lets users correct errors easily or review the tutorial.

In addition to the Profit Analysis model, five other ready to run program templates are included: Time Management, Future Cash Flow Analysis, Portfolio Valuation, Retirement Plan-

ning and a Loan Repayment Scheduler.

The slipcase package contains a spiral bound 236-page manual, with the sealed disk affixed to the inside front cover, and a command reference card. The contents may be removed at point of purchase for examination. Suggested retail price is \$59.95, and versions are available for the IBM PC: Apple II/II Plus/IIe; Atari 800 and Atari XL and XLD Series; and TRS-80 Model III.

Little, Brown and Co., Order Dept., Zoo West Street, Waltham, MA 02154. Reader Service number 491.

RTTY II

RTTY II is now available for the Commodore-64 and VIC-20 computers from RAK Electronics.

Your computer turns into a radio teletype video display terminal with RTTY II.

Special features include a split screen operation that composes replies while receiving, and four 255 character user-definable messages which may be saved on cassette or disk.

RTTY II has four preset messages: RTTY CQ, RY test, time transmission and CW ID. It also has select 60, 66, 75 and 100 wpm Baudot speeds.

RTTY II has a Morse code callsign ID, RTTY ID and an auto UNSHIFT on space. In all, RTTY II has 16 different functions and controls.

An instructional manual explains how to modify software for your callsign messages. A hardware manual is included with various interface designs, RS-232, TT1 and current loop terminal unit interfaces, as well as information on homebrew and commercial RTTY terminal units.

RTTY II requires VIC-20 with 8K memory expansion or Commodore-64, data cassette deck, and RTTY terminal unit, such as the HRA

A STAR IS BORN...



RUN has arrived for your Commodore 64 and VIC-20 computers.

RUN, the exciting new monthly that takes you beyond your instruction manual. RUN, packed with current information, entertaining programs, sage advice, and pure fun. RUN takes you from

- beginning BASIC to advanced graphics.
- candid product reviews to exciting new programs to type in and use.
- games to applications to informative tutorials.

Information. Entertainment. Advice. Fun... RUN has it all and for only \$19.97 per year. Subscribe today and get a 13th issue FREE with pre-payment by check or credit card.

Catch a rising star... RUN.

Start your subscription sooner by calling toll-free
1-800-258-5473

Commodore 64 and VIC-20 are registered trademarks of Commodore Business Machines, Inc.

R U N

Send me a subscription to RUN for only \$19.97 per year. I understand that with payment enclosed or credit card order, I will receive a FREE issue for a total of 13 issues for \$19.97.

- ☐ Check/MO ☐ MC ☐ VISA ☐ AE
☐ Bill me \$19.97 for 12 issues.

Card # _____ Exp. Date _____

Signature _____

Name _____

Address _____

City _____ State _____ Zip _____

Canada & Mexico \$22.97/1 year only, US funds drawn on US bank.
Foreign Surface \$39.97/1 year only, US funds drawn on US bank.
Foreign airmail, please inquire. Please allow 6-8 weeks for delivery.

33NF7

RUN • PO Box 954 • Farmingdale, NY 11737



Electronics TU-1 or MFJ RTTY TU. The TU-1 is a complete, ready to use terminal unit for MORSE II and RTTY II. It is available in kit or assembled form.

The package includes software and hardware manuals, and I/O edge connector. The cassette costs \$19.95, and the disk costs \$22.95. RAK Electronics, PO Box 1585 Orange Park, FL 32067-1585. Reader Service number 490.

Calcu-Plot

Calcu-Plot, a new package of powerful mathematical utilities that transforms complex equations into clean, easy-to-read graphics, is available for the Apple II and Apple IIe computers from Human Systems Dynamics.

With Calcu-Plot, users can solve a wide range of equations quickly and accurately. The program accepts data from keyboard, disk files and even from print format Visi-Cal files. Solved equations can be plotted one at a time, or in sets of two or three, on the same graph.

The program creates sequential disk files that can be used with all Human Systems Dynamics products.

The user may enter his own equations or select from 16 Cartesian or nine Polar standard equations with unlimited choice of constants and limits. The system will even print the graph on an Epson printer, or save the graph to disk for printing with any other printer.

Calcu-Plot is a valuable, easy-to-use tool for scientists, students, engineers, physicists, chemists or for anyone who needs accurate statistics for decision making. It comes with a complete tutorial plus a comprehensive manual that includes a number of typical examples and practice exercises.

Calcu-Plot users will soon have a choice of specialized applications disks. The applications disks will provide standard equations for a number of different disciplines.

Calcu-Plot is priced at \$150 complete, for use with Apple II or Apple IIe with 48K, ROM Applesoft, one or two disk drives, and optional printer.

Human Systems Dynamics, 9010 Reseda Blvd., Suite 222, Northridge, CA 91324. Reader Service number 489.

Blue Lynx

Techland Systems, Inc., a personal computer hardware and software design and marketing firm, announces the Blue Lynx 5251 Emulator.

It allows the IBM Personal Computer to emulate the functions of an IBM 5251 terminal and extend the life of Systems 34 and 38, and the new IBM System 36. This marks the first time 5251 emulation is available from any manufacturer for the IBM PC.

A PC equipped with Blue Lynx can process information off-line using its powerful stand-alone capabilities, and then feed information to the mainframe through inexpensive short-term telephone links.

Blue Lynx consists of a plug-in communications card with associated software on a floppy disk. It is easily installed in the IBM PC.

Blue Lynx costs \$690. Techland Systems, Inc., 25 Water-side Plaza, New York, NY 10010. Reader Service number 480.

Speed Reader II

Davidson & Associates introduces their new software, Speed Reader II, for the Commodore-64.

The Commodore version of Speed Reader II will have the same features as the current Apple II and IBM PC versions. The program contains six stimulating activities designed by reading specialists to increase speed and build comprehension.

A time reading test electronically computes the user's reading speed in words per minute and then tests comprehension. Warm-up exercises strengthen eye muscles to enlarge eye span and sharpen perception. Lessons in eye movement, column reading and text reading train the user to become a more efficient, effective and productive reader. These activities access a data disk containing 35 read-

ing selections.

It also features an editor that allows you to enter additional reading material and a grade-level analyzer that measures the reading level of the material entered.

Speed Reader II is designed for adult, high school and college students. Additional data disks for junior high and upper elementary students can be purchased from Davidson & Associates. The two-disk package contains a 60-page instructional manual with a course outline.

Speed Reader II costs \$69.95. Davidson & Associates, 6069 Groveoak Place, # 14, Rancho Palos Verdes, CA 90274. Reader Service number 481.

Hot Accounts

Computer Ed. announces Hot Accounts, an all new bookkeeping program for the Commodore-64 computer.

Hot Accounts is a financial records management system, designed for use in business applications, professional settings and home accounting management. The new software especially benefits individuals with no structured training in accounting practice who need to manage personal financial records.

The program offers full color high-resolution graphics and display options and can produce ten types of printed reports and income statements.

Hot Accounts records daily income and expense transactions and has full data retrieval capabilities. The system can search and sort information from the database by a single demand factor, or retrieve data based from requests multiple elements. Information may be either screen displayed or paper printed and bar graphed, with account totals and percentage factor highlights.

Other system features include on-screen user directions, automatic initialization to format new record storing disks, automatic back-up of financial records, controlled paging, memory space query and simple menu-driven operations. The package also includes an attractive, full sized

80-page user manual, which provides both technical system documentation and tutorial style bookkeeping instruction.

Hot Accounts is available on disk at \$64.95. Computer Ed., Software Division, 1002 Brooks Ave. West, San Diego, CA 92103. Reader Service number 482.

Financial Analysis System

Valuation Systems announces the Financial Analysis System (FAS). It is available for operation on microcomputer systems with CP/M and C-Basic, including the IBM PC and the Apple II Plus.

FAS is a comprehensive analysis system for property owners, appraisers, real estate brokers and investment counselors who need answers to "what if" real estate investment questions.

System modules permit analysis of a wide variety of simple to complex financial analysis situations including amortization, internal rate of return, cash flow, multiple regression, income and expense, time trend analysis and others for a total of 27 independent programs, divided into two volumes.

FAS features a master menu display for ease of operation and requires no programming knowledge. Program design features include flexibility, error trapping and self-prompting screens. Tutorial documentation is extensive and accompanied by examples to help the operator use each program to its fullest potential.

FAS Volume 1 costs \$125, Volume 2 is \$250 or both volumes for \$375. Valuation Systems Co., 1722 South Carson, Suite 3007, Tulsa, OK 74119. Reader Service number 484.

OpVal

The new CalcShop, Inc. product, OpVal, is a new stock option software that takes only 18 seconds to evaluate its 96 options. It is designed for the Apple III and can be used by professional and

Subscription Problem

Microcomputing does not keep subscription records on the premises, therefore calling us only adds time and doesn't solve the problem.

Please send a description of the problem and your most recent address label to:

**Microcomputing
Subscription Dept.
PO Box 997
Farmingdale, NY 11737**

Circle 64 on Reader Service card.

WHITE PASCAL TOOLS FOR JRT, MT + & MT + 86

SFP—includes 34 indispensable scientific functions such as circular, hyperbolic trig and inverses, log, exp, erf, gamma and others. MP + 86 and JRT versions are true double precision unlike MT + 86 originals which are only accurate to 7 digits. From as-fast-to-far-faster than the originals.

CAP—includes 26 complex algebra functions with basic arithmetic, exp, sqrt, log and conversions among reals, polar and rectangular. Allows complex value equations to be expressed in natural nested form. A must for engineers.

SIG—includes: A fast FFT and inverse. Simultaneous complex linear equation solver. Convolver, digital filter and root finder. A RPN complex value oriented calculator program designed for real engineering problems. Requires CAP package described above.

VED—A complete video screen editor with all the popular features. Command files can be executed for autotedit of large file sets. Our **BIGGEST PLUS** — The complete source code is provided to give you a base for your own specialized video editor. VED can be modified and recompiled for literally any microprocessor.

SFP, CAP, SIG \$35, 2/\$60, 3/\$75, \$25 for each additional. **VED**: \$85 or \$75 with purchase of any of the other packages.

Specify your Pascal version, 8" (IBM 3740) or IBM PC CPM formats. Send check or money order to: **WHITE LABEL SOFTWARE, P.O. Box 282, Holden, MA 01520. WE FILL ORDERS PROMPTLY!!!**

JRT™, JRT Systems, MT +, MT + 86™, Digital Research.

Circle 54 on Reader Service card.

MAKE A FORTUNE! By Writing A Computer Book

Put your personal knowledge and skills to work earning big money. Computer books sell more than any other one category of trade books. Our book publishing company needs 40 new computer books for a new line of non-fiction books. Also needed, other non-fiction books, how-to's, self-help, business, health, etc. Write for submission information: **BOOKMAN PUBLISHING CO., Suite 3-752, 1750 Kalakaua Ave., Honolulu, Hawaii 96826**

Circle 156 on Reader Service card.

Sure it's insured?

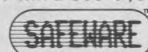
SAFWARE™ Insurance provides full replacement of hardware, media and purchased software. As little as \$35/yr covers:

- Fire • Theft • Power Surges
- Earthquake • Water Damage • Auto Accident

For information or immediate coverage call:

1-800-848-3469

(In Ohio call 1-800-848-2112)



COLUMBIA NATIONAL GENERAL AGENCY

Circle 132 on Reader Service card.

'68' MICRO JOURNAL™

6800-6809-68000

★ The only ALL 68XX Computer Magazine

USA

1 Yr. — \$24.50 2 Yr. — \$42.50 3 Yr. — \$64.50

*Foreign Surface Add \$12 Yr. to USA Price

*Foreign Air Mail Add \$35 Yr. to USA Price

*Canada & Mexico Add \$5.50 Yr. to USA Price

OK, PLEASE ENTER MY SUBSCRIPTION

Bill my: M/C ☐ — VISA ☐

Card # _____

Expiration Date _____

For ☐ 1-Yr. ☐ 2 Yrs. ☐ 3 Yrs.

Enclosed: \$ _____

Name _____

Street _____

City _____

State _____ Zip _____

**68 Micro Journal
5900 Cassandra Smith Rd.
Hixson, TN 37343**

Circle 339 on Reader Service card.

THE "BIT SCRUBBER"™ RECLAIM THAT PILE OF NOISY DISKS!

SAVE COST OF NEW DISKETTES!



Model No. 883

- Computer diskette residual noise eraser
- New, patented system erases and redefines the magnetic structure of any size diskette. (8", 5-1/4" or mini)
- Any format (SSDD, SSSD, DSDD, SSQD, DSQD, etc.)

Send \$49.95 (Fla. residents add 5% sales tax) plus \$4.00 shipping and handling charges to:



TECHSTAR INC.

8651 N.W. 56th Street
Miami, Florida 33166
Tel: (305) 592-0201

PRESERVE MICROCOMPUTING WITH BINDERS & FILE CASES.



Keep your issues of Microcomputing handy and protected in handsome and durable library file boxes or binders. Both styles are bound in dark blue leatherette with the magazine logo stamped in gold.

File boxes: each file box holds 12 issues, with spines visible for easy reference.

\$5.95 each, 3 for \$17.00, 6 for \$30.00

Binders: each binder holds 12 issues and opens flat for easy reading.

\$7.50 each, 3 for \$21.75, 6 for \$42.00

(USA postage paid. Foreign orders must include \$2.50 per item.)

Please state years desired (1977 to 1984).

Send check or money order to:

Jesse Jones Box Corp., P.O. Box 5120, Philadelphia, PA 19141; please allow 6 to 8 weeks for delivery. Sorry, no C.O.D. or phone orders.

Circle 349 on Reader Service card.

DUST COVERS

For Personal Computers, Peripherals, Game Units — Protective, Long-Lasting Vinyl Resists Both Dust and Liquids.

— CHOICE OF COLORS —

Amdek	IBM PC
Apple	Mattel
Atari	Rana Systems
BMC	Sanyo
Commodore	Star Micronics
Coleco	TI 99/4
Epsom	Timex Sinclair
Franklin Ace	TRS 80

FOR FREE BROCHURE WRITE:

ENCHANTED FOREST
P.O. Box 5261, Newport Beach, CA 92662
(1129 W. Balboa Blvd.)

TIMEX SINCLAIR

Software

Top Games

Mr. Munchie — (Arcade)	\$14.95
Speed Snake — (Arcade)	\$14.95
Bridge — (Card)	\$14.95
Chess I.....	\$14.95
Chess Master.....	\$19.95
Trader Trilogy (Fantasy).....	\$14.95
Alien Space Ship (Adventure).....	\$ 9.95

Home & Business

Personal Financial Pack (2 tapes).....	\$19.95
Stock Market Planning (2 tapes).....	\$19.95
Business Cash Management (2 tapes).....	\$19.95
Diet Programme (2 tapes).....	\$19.95

Programming Aids

Fastload (Load and save 6 times faster).....	\$19.95
ZX Assembler.....	\$14.95
ZX Bug (Monitor & Disassembler).....	\$14.95
Toolkit (9 new functions)	\$14.95

LANGUAGES

Tiny Logo.....	\$19.95
Forth.....	\$29.95

Hardware Specials

64 K RAM.....	\$99.95
Professional Keyboard with Metal Case.....	\$79.95
Memotech 16K RAM.....	\$29.95

Books

Timex Sinclair Learning Course with Binder, 2 Program Tapes	\$24.95
--	---------

Free Catalog

All software is
compatible with
**TS1000 TS1500
ZX81** Computers!
Call or write NOW!
COMING SOON!

New TS2068 software!

GLADSTONE

Electronics Inc. MC11
1585 Kenmore Ave.
Buffalo, NY 14217

Mail Orders: VISA, MASTERCARD.
Cheques or Money Orders. Add \$1.50 shipping.

In Canada: 1736 Avenue Rd., Toronto, Ont. M3J 2W6 800-268-3640

ORDER TOLL FREE

800-833-8400

Have VISA or MASTERCARD ready!

In New York
716-874-5510

Circle 373 on Reader Service card

EE/EPROM PROGRAMMERS & UV ERASERS

AFFORDABLE ★ RELIABLE ★ AVAILABLE

PROMPRO-7™ \$489.00
PROMPRO-8™ \$689.00



UV ERASERS
QUV-T8/1
\$49.95
*HOBBY

QUV-T8/2N
\$68.95
*INDUSTRIAL

QUV-T8/2T
\$97.50
*WITH TIMER
& SAFETY SWITCH

GANGPRO-8™
\$1,295.00
(GANG
PROGRAMMER)

RS-232 serial, STAND ALONE, INTELLIGENT

*EASY DUPLICATION *USER FRIENDLY *128K BUFFER

SUPPORTS: MOST 8K, 16K, 32K, 64K, 128K, 256K EPROMS

PROMPRO-8: KEY PAD OPTION, EPROM SIMULATION MODE

Microcomputer Chips: 8748 (H), 8749H, 8750, 8751, 8741, 8742, 8755A

SOFTWARE DRIVERS: MDS ISIS, TEKTRONICS 8002, IBM PC, ATARI,

APPLE II, CPM, FLEX, TRS-80

DIRECT HOOK UP TO ANY DUMB TERMINAL OR COMPUTER.

DISTRIBUTOR INQUIRY WELCOME.

LOGICAL DEVICES INC.

1321 E N.W. 65 Place, Ft. Lauderdale, FL 33309
Phone Orders (305) 974-0967 TWX 510-955-9496

novice computer users.

OpVal's information is divided into logical categories and is displayed on your computer's video monitor. This electronic book display combines the ease of menu-driven operation with the speed and flexibility of spreadsheet software. This helps refine your grasp of option strategies, track your risk/reward potential and locate better trades.

OpVal estimates the theoretical price of a single option and the theoretical value of a complicated position. The dividend adjusted Black-Scholes model incorporated in OpVal can account for the exact dividends on the exact dates that the underlying security "goes ex."

OpVal calculates option deltas (hedge ratios or share equivalents) for one option and for complicated positions. This helps you to estimate the effect of changes in the price of the underlying security on the value of your investments.

OpVal recalls security's dividends, ex-dividend dates, volatility, option cycle and strike prices from disk storage. It also automatically signs onto the Dow Jones News/Retrieval service and retrieves market prices for up to 80 underlying securities and their options.

OpVal graphs the changes of stock values over time as well as future underlying security prices. It estimates future rather than past volatility.

OpVal's program and manual costs \$250; the manual/demo disk costs \$35. CalcShop, Inc., PO Box 1231 W. Caldwell, NJ 07007. Reader Service number 485.

Mathematical Functions

White Label Software announces three mathematical function packages designed for the needs of the scientist, engineer and advanced programmer.

All versions consist of Pascal external functions that may be linked to user written software and extend the power of the popular MT+, MT+86 and JRT Pascal Compilers.

The scientific function package (SFP) is designed to be unique to the software market. Thirty-four scientific functions are included—most require special mathematical derivation from White Label's mathematicians. True double-precision results are provided in the same amount of time it takes other systems to produce figures with only seven significant digits. Execution is also faster than with JRT-provided functions.

The complete arithmetic package (CAP), includes 26 complex algebra functions. A special set of functions allows complex value equations to be expressed in natural nested from eliminating tens of lines and temporary variables for an equation.

The signal analysis package (SIG), includes fast implementation of an FFT and its inverse, a convolver, digital filter, complex root finder and a simultaneous complex linear equation solver. It also has an RPN complex value oriented calculator program designed for real engineering problems. SIG requires CAP in order to run.

All three packages are available for \$35 each, two for \$60, three for \$75, and \$25 for each additional. Send check or money order, stating which packages you want to order, your Pascal version and disk format to White Label Software, PO Box 282, Holden, MA 01520. Reader Service number 486.

Dr. Logo

Dr. Logo, a powerful, easy-to-use, graphics-oriented educational programming language is now available for the IBM PC and PC-XT.

Dr. Logo is an advanced version of the popular programming language, Logo. It's enhanced to match 16-bit personal computers, and has features to simplify programming for beginners and experienced users.

Dr. Logo is an interactive program. It has its own operating system, advanced editing and debugging features, and work-space management tools.

Written in C, a high-level

language, Dr. Logo can be transported to any computer system. It incorporates "turtle" graphics to indicate positions and headings. The turtle leaves a trail in one of four user-selected colors to form a graphics image.

Dr. Logo offers over 10,000 nodes of memory to the user. It also has built-in help commands that explain and give examples of Dr. Logo primitives. Commands and editing statements can be displayed in a window on the computer's screen so that the text does not interfere with the user's graphics.

Dr. Logo also supports double-precision floating-point mathematics, including a full set of transcendental functions, logarithms and their inverses. It supports 15 significant digits, making it suitable for business and technical applications.

Dr. Logo costs \$149.95. Digital Research, Inc., 160 Central Ave., Pacific Grove, CA 93950. Reader Service number 487.

Offix

Emerging Technology Consultants, Inc., has developed an office document system for the IBM Personal Computer that integrates electronic filing functions, word processing, form design and report generation.

The Offix system is designed for the user who wants a basic, multifunction office package that is so easy to learn that it makes obsolete the printed manual.

The innovative software package is supported by pictorial displays that visually guide operators in creating and retrieving documents, fields of documents and "drawers" of files. Displays are created with standard characters and work on a monochrome or color monitor.

The word processing segment is fully capable of handling routine correspondence and documents up to 100 pages. System operators can create their own forms and document formats without any understanding of computer jargon. The user simply follows office procedures ra-

ther than computer procedures as he creates fields, records and data files.

The hierarchical filing system, translated into office language, consists of two file cabinets, each with three drawers. The capacity of each drawer is 100 file folders. A file folder may contain any number of documents or forms up to the capacity of one disk.

In applying the report-generation capability, you can design tabular displays and perform sort and arithmetic operations.

Offix requires an IBM-compatible MS DOS operating system.

Offix is available for \$99. Emerging Technology Consultants, Inc., 2031 Broadway, Boulder, CO. Reader Service number 488.

Critical Connection

USS Enterprises announces its improved software Critical Connection.

This interface allows an Atari 400 or 800 to use the disk drives, printer and keyboard of any computer system running CP/M, as long as the system has a serial port at 19,200 baud.

The Critical Connection lets you write and edit Atari programs on either their CP/M system or their Atari. The programs can then be stored on the CP/M disk drives or printed up on the CP/M printer.

The Critical Connection includes such features as an automatic install for many systems including the Kaypro, Sanyo and Heath-Zenith; hardware that connects the CP/M serial port to the Atari disk/prINTER port that can be located up to 15 feet away; and software on an eight-inch single density disk that allows the CP/M disk drives, printer and keyboard to replace their regular Atari counterparts.

It also has the ability to simulate, with the CP/M system, four Atari disk drives simultaneously. Its software buffers your CP/M keyboard and printer as well as provides error detection and recovery.

The Critical Connection costs \$175. USS Enterprises, San Jose, CA 95120. Reader Service number 483.

Circle 235 on Reader Service card.

Commodore 64 and VIC-20

SuperTerm

\$99⁹⁵

Telecommunications

with a difference!

Unexcelled communications power and compatibility, especially for professionals and serious computer users. Look us over; **SuperTerm** isn't just "another" terminal program. Like our famous Terminal-40, **it's the one others will be judged by.**

- **UP/DOWNLOAD FORMATS**—CBM, Xon-Xoff, ACK-NAK, etc.
- **DISPLAY MODES**—40 column; 80/132 with side-scrolling
- **EMULATION**—42 popular terminal protocols
- **FUNCTION KEYS**—8 standard, 52 user-defined
- **BUFFERS**—Receive, Transmit, Program, and Screen
- **EDITING**—Full-screen editing of Receive buffer
- **FILE CONVERSION**—ASCII to PGM, PGM to ASCII
- **PRINTING**—Continuous printing with Smart ASCII and parallel printer; buffer printing with other interfaces or VIC printer
- **DISK SUPPORT**—Directory, Copy, Rename, Scratch, etc.
- **FLEXIBILITY**—Select baud, duplex, parity, stopbits, etc.

Program options are selected by menus and function keys. For maximum convenience, an EXEC file sets options on start-up. SuperTerm may be backed-up for safety. Software on disk or cassette, with special cartridge module.

Write for the full story on SuperTerm; or, if you already want that difference, order today!

Requires: Commodore 64 or VIC-20, disk drive or Datasette, and compatible modem. VIC version requires 16K memory expansion. Please specify VIC or 64 when ordering.

Just need UP/DOWNLOAD?

If you don't yet need SuperTerm's power, perhaps **Terminal-40 Plus** (VIC) or **'64 Terminal Plus** is right for you. We took our top-rated, smooth-scrolling terminal programs, added up/download, disk commands, and even more convenience. Then we put them on disk for fast loading, just like you wanted. Need we say more?

Only \$49.95 (VIC version requires 8K mem exp)

P.S. Trade in your original Terminal-40 or '64 Terminal and deduct \$10.00.

VIC 20 and Commodore 64 are trademarks of Commodore Electronics, Ltd.

(816) 333-7200

Send for a free brochure.



**MIDWEST
MICRO Inc.**

MAIL ORDER: Add \$1.50 shipping and handling (\$3.50 for C.O.D.); VISA/Mastercard accepted (card# and exp. date). MO residents add 5.625% sales tax. Foreign orders payable U.S.\$, U.S. Bank ONLY; add \$5 shp/hndlg.

311 WEST 72nd ST. • KANSAS CITY • MO • 64114

NEW PRODUCTS



The Eagle PC is a modular business computer system from Data Access Systems.

It's an Eagle

Data Access Systems, Inc., announces the new Eagle PC. Its hardware and software is compatible with the IBM PC.

The Eagle PC features a 16-bit microprocessor, a high-density floppy disk storage, as well as 128K of main memory that expands to 512K on the main CPU board. A dual 320K floppy disk drive gives data storage a capacity equal to 500 pages of text.

The Eagle PC operates both serial and parallel printers. It also features three IBM PC-compatible expansion slots that expand data storage capacity. The local area network option creates office automation of up to 64 stations.

It has a sculpted detachable keyboard with 24 pre-programmed function keys that use Eaglecalc (spread calculator) and Eaglewriter (word processing) software. The system comes with three I/O ports. The additional storage option uses either ten-

or 32-megabyte Winchester drives.

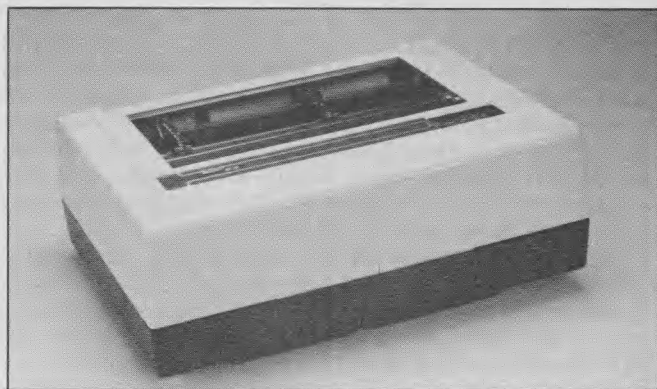
The Eagle PC is available at \$1995. Data Access Systems, Inc., Cole Road and Camden Avenue, Blackwood, NJ 08012. Reader Service number 461.

Graymatter

IQ Systems introduces its new Graymatter Disk Storage System. This hard disk mass storage system is now compatible with the IBM line of personal computers.

The Graymatter system is currently compatible with the Apple II and IIe, Xerox 820 and 820-II and Osborne 1 single- and double-density systems, and other computer lines. Three models are available, offering five, ten or 20 megabytes of memory.

With the Graymatter 5¼-inch Winchester disk system, data can be retrieved up to eight times faster than with floppy disks. The system also



Plot 10 is a new plotter/printer from Facit, Inc.

offers as much as 40 times the storage capacity of a standard floppy disk system. The Graymatter 10 provides more on-line data access than 60 mini floppy disks.

By adding the compatible Graymatter system to the IBM PC, you can eliminate time wasted filing and retrieving disks as the information they need will be only fingertips away. The IBM-compatible Graymatter kit includes software, an adapter card and illustrated instruction manual for easy, turnkey integration with the IBM PC line.

Also available is a Graymatter system with tape back up. This system provides an additional ten megabytes of storage that can be used either simultaneously as data is

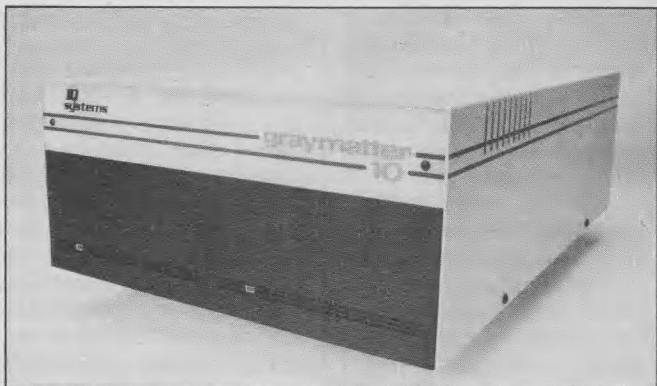
updated or as an end-of-day back-up device. All Graymatter systems come with a one-year warranty.

The Graymatter 5 retails for \$1195, the Graymatter 10 for \$2495 and the Graymatter 20 for \$3695 from IQ Systems, 2931 La Jolla St., Anaheim, CA 92806. Reader Service number 463.

A Colorful Plot

Facit, Inc., introduces the Plot 10 Plotter/Printer. It is a version of its 4542 two-color and 4544 multicolor printers.

The new plotter/printer instantly switches from graphics functions (gray scale scanning) to high-performance data processing printing of



Graymatter 10, from IQ Systems, is a hard disk mass storage system that is compatible with the IBM PC.

Deadline Extended!
Win \$500 Worth of Prizes!!

Now is your chance to cash in on your robotics programming skill and creativity. Enter the first Microcomputing/Heath Company

HERO 1 programming contest and win up to \$500 worth of prizes.

Microcomputing magazine, in conjunction with the Heath Company, manufacturers of the HERO 1, invites all HERO 1 programmers to submit their best applications to this contest. Entries will be judged in the following categories:

1. Standard HERO 1 with arm.
2. Modified HERO 1, including additional RAM or ROM, as well as any mechanical or electrical modifications.

Prizes will be awarded to the top three entrants in each category. Two \$500 gift certificates (one from each category) will be awarded. Each first place winner will select the prizes of his choice, worth up to \$500, from the latest Heath Company catalog. A \$100 gift certificate, good toward any purchase from the Heath catalog, will be awarded to both second place winners. Third place winners from each category will receive a copy of Microcomputing columnist Mark Robillard's new book, "HERO 1 Advanced Programming and Interfacing," plus a one-year paid subscription to Microcomputing magazine.

CONTEST RULES

1. All programs must be submitted both on cassette tape and in hard copy form. A brief, written description of the application must accompany each entry.
2. Entries in the modified category must include a complete description of the alterations performed on the robot.
3. The contest is open to all HERO 1 owners, except



employees of Wayne Green Inc. (publisher of Microcomputing), and the Heath Company and their immediate families.

4. All entries, including programs, become the property of Microcomputing.
5. All entries must be received by Microcomputing by March 1, 1984.

Send submissions to:

**Robotics Contest
 Microcomputing
 80 Pine Street**

Peterborough, N.H. 03458

7. Contestants may submit more than one entry in one or both categories. Entries will be judged on originality and technical feasibility. The more practical and easily adaptable the application, the better. Winners will be announced in the June 1984 issue of Microcomputing. So rev up your robot, and let's put the Heath's HERO through its paces!

MICROCOMPUTING®

80 PINE STREET PETERBOROUGH, NH 03458



DAISY WHEEL

New Smith Corona TP-1

True letter quality printer for less than the cost of an office typewriter! Priced \$500 less than other popular daisy wheel printers!

SALE PRICE:

\$459

FEATURES:

- ★ Friction feed
- ★ 15 cps, 120 wpm
- ★ Changeable daisy wheels
- ★ Parallel or serial interface
- ★ Compatible with R/S, Apple, etc



SUNLOCK SYSTEMS

4217 Carolina Ave
Richmond, Va 23222

ADDITIONAL PRINTER SPECIALS

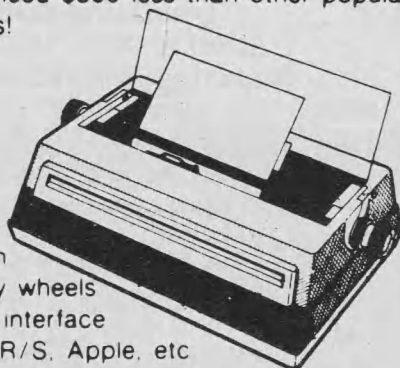
<u>Epson</u>	<u>Okidata</u>	<u>Gemini</u>	<u>C. Itoh</u>
RX80 \$329	82A \$399	10 \$319	8510AP \$399
80FT 429	83A 639	10S 409	1550P 699
FX80 559	92 499	15 469	F10-40 1149
FX100 739	93 849	15S 559	F10-55 1595

WE WILL MEET ANY ADVERTISED COST IN-STOCK

TO ORDER CALL TOLL FREE 800-368-9191

In Virginia call 804-321-9191

We accept MasterCard, Visa and CODs



conventional text. It also has the ability to mix plot and text modes, and features an Alpha mode repertoire of 96 characters.

The Plot 10 Plotter/Printer also features the Facit 5162 Front End Processor. This provides unusual plotting capability to Facit's top-of-the-line 4544 and 4542 printers. The 5162 interface in the new plotter/printer provides several advantages over conventional plotters. Multicolor plotting with the 4544, or two-color plotting with the 4542 version, is always readily available in contrast to pen changing.

The 4542 Plotter/Printer produces graphics and text in black and red. The 4544 version can produce hues in the whole color spectrum by mixing its cyan, magenta, yellow and black basic colors.

The 4542 Plotter/Printer is available at \$3900 and the 4544 Plotter/Printer is available at \$4600. Facit, Inc., 235 Main Dunstable Road, Nashua, NH 03061. Reader Service number 462.

er memory equals approximately 20 pages of text. All buffering is done transparent to the user and is compatible with Applesoft, CPM and Pascal operating systems.

The ADS-8211 includes a unique screen dump feature. This feature takes a snapshot of the data on the screen and sends it to the printer. It will copy and dump hi-res graphics screens as well as text to ADS, C. Itoh, NEC and Epson dot matrix printers (dip switch selectable). Graphics dumps can be of normal or inverse shading, straight or rotated 90 degrees and one of two sizes.

Included with the Grafax Spooler is six feet of ADS-703 flat cable, with a 36-pin Centronics-type connector (Amphenol 57-30360 or equivalent).

The Grafax Spooler costs \$229. Antex Data Systems, 2630 California St., Mountain View, CA 94043. Reader Service number 465.

Low-Cost Four-Color Plotter

Yokogawa Corp.'s PL-1000 four-color plotter is now offered with a PROM that provides the unit with a built-in capability to generate pie, line and bar graphs without external programming.

It also provides a cross-hatching and labeling/lettering capability. With this new option, downloading of information from a computer to the graphics plotter can be done much faster and without additional programming.

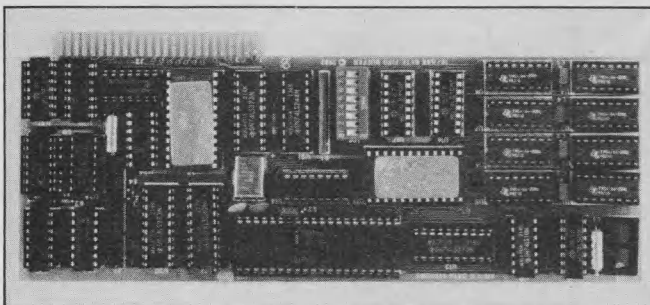
The PL-1000 plotter has a standard RS-232 interface and plots on paper or foils to 11 x 15 inches. It is compati-

Grafax Spooler

The ADS-8211 Grafax Spooler/64 is designed to allow Apple II Plus or Apple IIe microcomputers to go on computing even when data is backed up on printers.

The ADS-8211, designed by Antex Data Systems (ADS), provides an intelligent parallel printer interface with 64K buffer memory and an 8039 microprocessor.

The Grafax spooler board takes the data from the Apple and stores it during printing, thereby freeing the Apple to do other things. The 64K buff-



The ADS-8211 Grafax Spooler/64, from Antex Data Systems allows Apple II Plus and Apple IIe computers to continue processing when printers are backed up.

Circle 189 on Reader Service card.

TRS-80*

100% Radio Shack Equipment

SAVE A BUNDLE

Order Toll Free 1-800-874-1551

FLA Residents 904-438-6507 collect

EPSON, OKIDATA, CITHO,

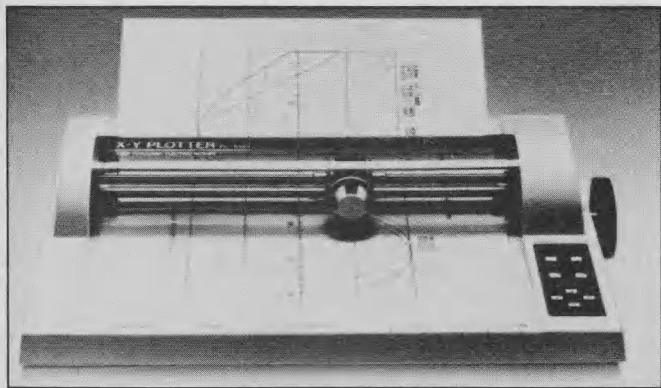
TABCO Printer Switches



SALES CO.

704 W Michigan Ave;
P.O. Box 8098
Pensacola, FLA 32505

*TRS-80 is a trademark of Tandy Corporation



PL-1000 is a four-color plotter from Yokogawa Corp.

ble with most small computer systems. Standard unit price is less than \$1300. This new PROM option is \$215 more than existing units and can be retrofitted at the Yokogawa factory. Yokogawa Corp. of America, 2 Dart Road, Shenandoah, GA 30265. Reader Service number 468.

Maverick

The first rigid disk controller for the IBM PC and PC look-alikes that can support the SMD interface commonly used in microcomputers has been developed by Interphase Corp.

Called the Maverick SMD PC-80, the high-performance controller offers increased capacity and speed benefits of the SMD interface. It can accommodate eight-inch disks or other disks with fixed and/or removable cartridges without software or hardware modifications.

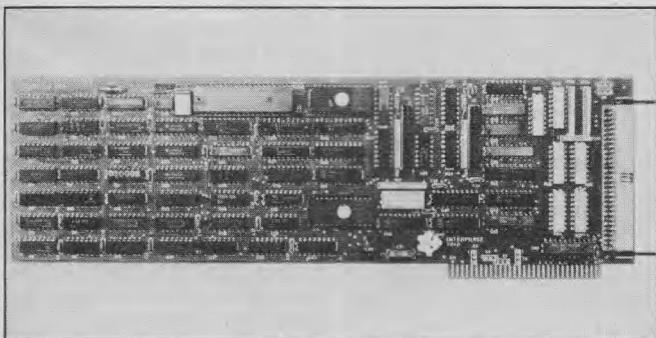
The Maverick's design brings to the personal computer level the capacity needed for large accounting and database management appli-

cations. It eases performance bottlenecks now experienced at network file servers, and can provide economical mass storage for all PCs in a network.

Through the use of high-performance SMD-compatible drives from such manufacturers as CDC, Fijitsu and Amcodyne, the Maverick offers throughput rates that are three times that of IBM PCs or XT's equipped with a standard Winchester disk.

Other design advantages of the Maverick include its ability to support two SMD disk drives on any IBM PC or PC look-alike, to offer a storage capacity ranging from 16- to 800M per disk and to reduce parts count for higher reliability (60 integrated circuits on the board compared to 100 or more ICs for similar products). The Maverick also provides automatic error correction with 32-bit ECC, bad track and sector replacement, and overlapped seeks.

The Maverick is priced at \$1895. Interphase Corp., 2925 Merrell Road, Dallas, TX 75229. Reader Service number 467.



The Maverick SMD PC-80 is a high-performance rigid disk controller from Interphase Corp.

YORK 10TM CASSETTES DISKETTES



- LOWER PRICES
- LONGER LENGTHS

DATA TRAC C-06, C-12, C-24

From the leading supplier of Computer Grade Cassettes, new, longer length C-12's (6 minutes per side) provide the extra few feet needed for some 16K programs.

CASSETTE STORAGE CADDY



Holds 12 cassettes w/o boxes
Includes edge labels and index card



TRACTOR FEED
• DIE-CUT BLANK CASSETTE LABELS



Premium 5-screw shell with leader
— BASF tape



Internationally acclaimed.
Thousands of repeat users.



Error Free • Money back Guarantee



500 C-12's—38¢ each • w/labels

Shipping \$17.500

add 4¢

500 Boxes 13¢ ea. • shipping \$10.600



BASF Qualimetric Flexi-Disc—Lifetime Warranty.
5 1/4" Single Side. Double Density, Soft-Sector.



NEW! MICRO CASSETTES in convenient short lengths.

MC-10

MC-20

MC-30

Same superior tape in premium shell
WITH LEADERS. Supplied complete with
box (fits Epson & Sharp micro drives).



Call: 213/700-0330 for IMMEDIATE SHIPMENT
on Credit Card Orders



ORDER NOW... MAIL TO: YORK 10TM Computerware
9525 Vassar Ave. #H Chatsworth, CA 91311

ORDER FORM

ITEM	1 DOZEN	2 DOZEN	TOTAL
C-06	<input type="checkbox"/> 7.00	<input type="checkbox"/> 13.00	
C-12	<input type="checkbox"/> 7.50	<input type="checkbox"/> 14.00	
C-24	<input type="checkbox"/> 9.00	<input type="checkbox"/> 17.00	
Hard Box	<input type="checkbox"/> 2.50	<input type="checkbox"/> 4.00	
Blank labels	<input type="checkbox"/> 3.00/100	<input type="checkbox"/> 20.00/1000	
Storage Caddy @ \$2.95 ea. Qty			
Flexi-Disc	<input type="checkbox"/> 26.95/10	<input type="checkbox"/> 120.00/50	
MICRO CASS.	1 DOZEN	2 DOZEN	
MC-10	<input type="checkbox"/> 16.50	<input type="checkbox"/> 32.50	
MC-20	<input type="checkbox"/> 18.00	<input type="checkbox"/> 34.50	
MC-30	<input type="checkbox"/> 19.00	<input type="checkbox"/> 36.00	
SUB TOTAL			
Calif. residents add sales tax			
SHIPPING/HANDLING Any quantity (except 500 special)			3.50
Outside 48 Continental States—Additional \$1 per caddy; per doz. cassettes; per doz. boxes; per 10 discs			
TOTAL			

Check or M.O. ☐ Charge to ☐
enclosed ☐ Credit Card ☐ VISA ☐ MASTERCARD
☐ PLEASE SEND QUANTITY DISCOUNTS

#H

Card No. _____ Exp. _____

Name _____

Address _____

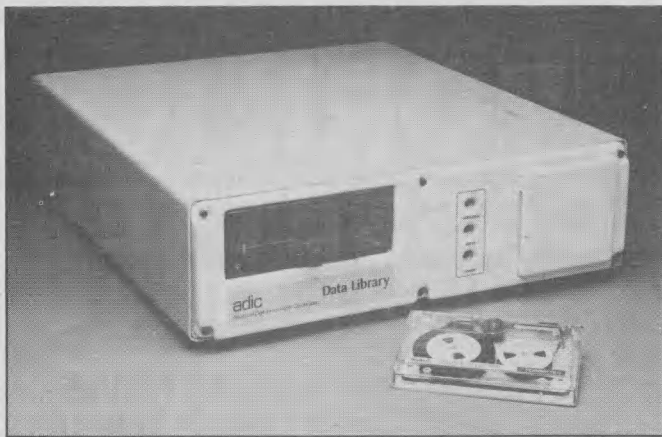
City _____ State/Zip _____

Signature _____ Phone _____

Computer make & model _____ Disk? (y/n) _____

Each std. cassette includes two YORK 10 labels only. Boxes are sold separately. We prefer to ship by UPS as being the fastest and safest. If you need shipment by Parcel Post, check here ☐

NOTE: Additional charges outside 48 Continental States. Shipments to AK, HI, and USA possessions go by Priority Mail: Canada & Mexico—Airmail; All others—Sea Mail



Data Library is a large cartridge tape system for the Apple computer family.

Data Library

Advanced Digital Information Corp. (ADIC), announces a large-capacity cartridge tape system for the Apple computer family (including the Apple II, II Plus, IIe and III) called the Data Library.

The Data Library features a removable cartridge that is block addressable. Each cartridge is preformatted to allow random data access. Data access time for large files is similar to standard disk drives.

Software is included with the Data Library to organize files under DOS 3.3 in the same manner as a hard disk. Each formatted cartridge contains 170 volumes, with 48 tracks, each track having 32 sectors and each sector having 256 bytes; thus, each removable cartridge has storage equal to 515 standard Apple DOS 3.3 disks.

The interface card, which utilizes one slot of the Apple computer, has a RAM buffer for instant directory and file access. The buffer memory can be expanded from 64K to one megabyte, allowing it to function as a RAM disk.

A combination of large addressable capacity (170 volumes) and the RAM disk feature makes the Data Library an ideal system for large database programs.

The Data Library is well-suited for disk backup and multi-user network systems, and it's fully compatible with the Corvus network for Apple computers.

Low media cost (\$35 per 67M cartridge) and high reliability (10,000 MTFB) are fea-

tures of the Data Library.

The Data Library ranges in price from \$2900 to \$4900. Advanced Digital Information Corp., 723 9th Ave., Building A, Kirkland, WA 98033. Reader Service number 473.

How Do You Spell Relief? B-y-t-e B-a-t

Have you ever felt frustrated when a computer or terminal didn't do exactly what you thought it should? Ever contemplated acts of violence while waiting for that remote host computer to respond to your query? Have you ever had a whole afternoon's work wiped out by a glitchy disk or a power surge?

If so, you'll agree that the Byte Bat is an idea whose time has come. Hitting a computer or terminal with anything substantial can be a satisfying but expensive act. Byte Bat allows you to constructively vent your frustrations as it protects your computer.

The Byte Bat is a foam rubber baseball bat, 17 inches long, that will give you a harmless but satisfying way in which to "strike back" at computers. Specially designed to serve as a frustration shunt, the Byte Bat features a number of digital interface modes, plus BAUD rates (Basic Aggressive Units of Dissatisfaction) of from one to 12,675,432. The device is compatible with all computers and operating systems, making it the first universally compatible foamware.

The Byte Bat is being distri-



The Z-80B CPU board, from QDP Computer Systems, with high-speed data transferal.

buted through computer dealers nationwide at a suggested retail price of \$9.95. It can be ordered for \$12.50 by calling 800-227-3900 or 800-632-2122 in California. MicroTie Systems Corp., PO Box 8112, Walnut Creek, CA 94546. Reader Service number 474.

Fast-Pace Processor

QDP Computer Systems has upgraded its QDP-100 series with a Z-80B CPU board. This increases speed from 4 to 6 MHz and provides the QDP cache memory with an ultimate environment for disk track buffering.

A Z-80A DMA processor permits high-speed data transfer. Other features include 128K of RAM, two eight-inch, double-sided, double-density floppy disks and QDP help and menu programs, along with Perfect Software.

This S-100 bus microcom-

puter's speed depends on the amount of disk accessing in a given program. A six-slot motherboard offers more expansion capability than before and provides up to six serial ports and two parallel ports.

Users with engineering and manufacturing applications will find this 6 MHz QDP microcomputer to be the answer for faster processing.

QDP Computer Systems also announces a price reduction on its peripheral drive. A 30M hard disk add-on unit for the QDP-100 series now carries a suggested retail of \$6995, a reduction of \$1000 from its introductory price. QDP Computer Systems, 10330 Brecksville Road, Cleveland, OH 44141. Reader Service number 472.

Multibus Board

Advanced Micro devices introduces Multibus. This is the industry's first 1M, high-performance, low-power Multibus-compatible RAM board with parity using AMD's 64K dynamic RAMS.

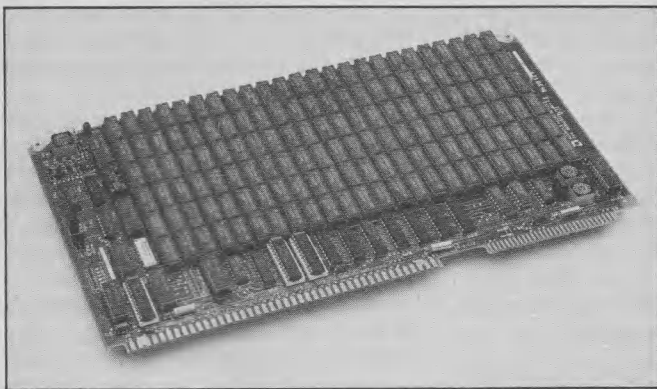
By replacing a half megabyte board with AMD's board, you can increase the amount of system memory or the number of available card slots, reducing the size and/or cost of the system.

The board makes use of AMD's PAL (programmable array logic) devices to reduce the on-board parts count and to provide high density.

Board memory can start on any 64K boundary and can cross any megabyte bound-



Byte Bat, from MicroTie Systems Corp., gives your computer the ZAP it deserves.



Multibus, from Advanced Micro Devices, is a 1M, high-performance RAM board.

dary. Rotary switches are included to make setting the starting address simple. An optional lock-out feature has also been included for flexibility—the lower 32K and/or upper 64K addresses of the first megabyte can be disabled on-board.

Other features include eight- or 16-bit word size with byte-swapping capability, parity with the latching error register, interrupt generation and on-board refresh circuitry (a 350 ns maximum refresh cycle every 14 microseconds).

The Multibus is available for \$2995, from Advanced Micro Devices, Inc., 901 Thompson Place, Sunnyvale, CA 94086. Reader Service number 471.

Prometheus 1

The Videobook Corp. announces the Computer/VCR Interactive Interface and Authoring System for Commodore-64 and VIC-20 computers and home videocassette recorders.

The Interactive Interface, called the Prometheus 1, will connect your VIC-20 or Commodore-64 to any of the older Panasonic 5000-series videocassette machines, to the newer Panasonic 6500 portables or to the 8500 standard VCRs. The Prometheus 1 will also connect various models of Magnavox, Canon and Hitachi VCRs to the computers.

The introduction of the Interactive Interface means that anyone can have a home or office computer/VCR learning center for less than \$1000 for the hardware configuration. This new module clears the way for mass development of

the long-anticipated Videotape Interactive Courseware Market. Videobook Corp. has developed an extensive catalog of Interactive Courseware, for both education and entertainment for the home and office.

The system includes the new and powerful Comp-U-Tutor. This authoring system is designed to allow parents or office managers to play back prerecorded packaged commercial programs and to allow anyone to write his own custom program for home, office or corporate training systems.

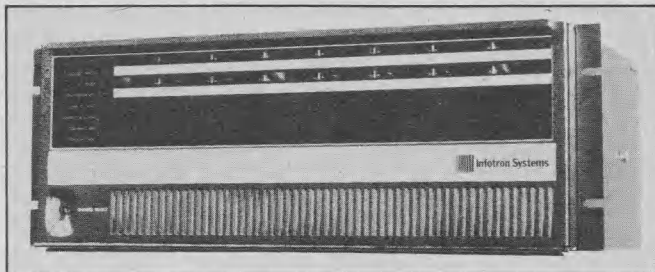
The interface costs only \$49.95 by direct mail. Videobook Corp., PO Box 19597, Seattle, WA 98109. Reader Service number 469.

Triple Modem

Infotron Systems Corp. (OTC-INFN) introduces the DSM/Triple Modem, a rack-mounted modem that automatically responds to Bell 212A, Bell 103 and Vadic VA3400 originating modems.

This answer-only unit handles serial binary data at low synchronous (1200 bps) and asynchronous (1200 and 0 to 300 bps) speeds. Character lengths run from eight to 11 bits, depending on the mode. When the Triple Modem is used in the dial-up network, you simply dial one phone number. The modem sets up the user session CPU port efficiency.

The DSM/Triple Modem benefits large time-sharing and service networks that support low-speed, dial-in devices. Included are networks for banks, telephone carriers



DSM/Triple Modem, from Infotron Systems Corp., is a rack-mounted modem.

and manufacturers, as well as those for personal computers and office automation applications.

An internal microprocessor provides mode flexibility, enhances self-diagnostics, and reduces modem size. A modem-detect algorithm implemented in the microprocessor determines the type of unit originating the call, and automatically switches the unit into the compatible mode.

The DSM/Triple Modem costs \$850. Infotron Systems Corp., Cherry Hill Industrial Center, Cherry Hill, NJ 08003. Reader Service number 466.

Portable Voice

Words+, Inc., has developed the first portable artificial speech device to use a computer.

The Portable Voice combines a text-to-voice synthesizer and Epson's HX-20 in a 9½-pound unit. Designed for use by the speech-impaired, the unit is equipped with a carrying handle.

Programmed with Talk, an

easy-to-use language not available with any similar product, the Portable Voice produces spoken and printed messages and stores up to 99 sentences in its memory.

To produce speech, you simply turn on the machine's two power switches, press the 3 key, type the desired words and press the return key. A stored sentence is recalled by pushing the key coded for that sentence and the return key.

After 50 hours, the computer is recharged with an Epson power supply unit. The synthesizer runs two hours without recharging and can be recharged by plugging into an ac outlet or a car cigarette lighter. The Portable Voice runs indefinitely when plugged in.

The Portable Voice also performs all of the standard functions of the HX-20 with SkiWriter word processing software, a microcassette drive, a built-in printer and 16K RAM (expandable to 32K).

The Portable Voice retails for \$1449 from Words+, Inc., Sunnyvale, CA. Reader Service number 464.



Portable voice, from Words+, Inc., aids people with speech impairments.

REVIEWS

(From p. 146)

vs calories eaten, or weight vs sugar and so on. This allows you to make any correlation you wish. The program will even let you make up categories that can be plotted (like emotional or blood pressure categories).

Finally, there is the diet-planning section. With the information entered in other segments, this program will ask you how much you wish to weigh and over how many days you wish to achieve the weight. Using standard tables, it will tell you in what range someone of your sex, height and age should weigh. It will then compute the caloric and exercise requirements for the program and will guide you meal-by-meal.

The package comes with a 193-page, 8 x 11 manual that not only explains the program but gives documentation and support to the calculations and assumptions made to the program. Many screens

are illustrated, and they are fairly well-keyed to guide you through the program.

Because of the program's complexity, the manual should be studied before beginning the entries. There are a few sections that seem out of place; for instance, the set-up program, Needs, is found later in the book, making some page-flipping necessary. Because the set-up came so early, I worried that the entire program would be tricky to follow. However, it wasn't too difficult once I became used to the progression of the program.

The software was friendly in its error handling. The program comes on four sides of two disks. Therefore, it was sometimes confusing. The program would politely remind me, as many times as necessary, to insert the proper disk. Occasionally, especially in the early set-up stage, it was unclear as to what information was being saved and what wasn't. When I first entered my height, I accidentally made myself a foot taller. It was not immediately clear how I could redo the screen to correct the information.

Health-Aide may well be the most powerful health and nutrition package available for any personal computer. It could

be the VisiCalc of the nutritionist! It allows you to follow as much or as little of your health progress as your interest or needs require.

The more I used this program, the more interested I became in the various factors that affect health. Health-Aide quantified which exercises were good caloric burners and which foods should be avoided. It allowed instant comparisons of many different complex health factors and visualized the relationships between elements.

For anyone serious about health care—for this is a serious program—I would heartily recommend Health-Aide. A few hours spent mastering each of the program's modules will enable you to monitor the body's complex needs.

Health-Aide requires an Apple II with 48K and one disk drive. It supports most printers and will automatically configure for graphics mode as required. The program retails for \$79.95 and is available from dealers or from Knossos, Inc., 422 Redwood Ave., Corte Madera, CA 94925.

Keith Thompson
Microcomputing staff

Health-Aide Dinner

Code	Description	Units	Amount
RIC-IN	RICE/INSTANT/COOKED	1 CUP	.5
BEA-RC	BEAN/RED KIDNEY/CND	1 CUP	.4
TORTIL	TORTILLA/CORN/YELLOW	6 " DIA	1
CHK-WI	CHICKEN/WING/FRIED	1 AVG	1
CH-CH	CHEESE/CHEDDAR	1 OZ	1
CR-SOU	CREAM/SOUR CULTURED	1 CUP	.1
LET-IB	LETTUCE/ICEBERG/CHPD	1 CUP	.5
TOMA-R	TOMATO/RAW	1 AVG	.5
ONIN	ONION/COOKED	1 CUP	.5
CANT-R	CANTALOUPE/RAW 1/4	1 AVG	.5

Table 1. Screen print of dinner menu.

Health-Aide Meal Analysis

Item	AMT	%RDA	Item	AMT	%RDA
CALR	708.8	70%	V-C	136.1	226%
CARBH	89.84	76%	V-E*	.61	6%
T-PRT	30.93	55%	SODM	641.5	29%
FIBER	3.35	55%	PHOSP	490.2	61%
SFAT*	11.8	107%	POTSM	1541.	41%
USFAT*	11.4	51%	CALCM	399.4	49%
FATS	27.25	82%	IRON	5.674	56%
CHSTL*	79.2	26%	MAGNM*	90.6	25%
V-A	1139.	113%	ZINC*	2.402	16%
V-B1	.446	31%	SUGR	0	0%
V-B2	.404	25%	COST	1.381	0%
V-B6*	.579	26%	PUFAT*	3.27	29%
VB12*	.419	13%	ALCH	0	0%
FOLCN*	92.4	23%	WATER	1193.	0%
NIACN	6.635	36%	PUFAT:SFAT =	27	

CARB=50% FAT=34% PROT=17% ALCH=0%

Table 2. Analysis of dinner menu.

Utilize "Bag of Tricks"

Softwares' unsung hero
Is a true craftsman's
Professional tool

Any day now I expect Quality Software to add the following message to the Bag of Tricks packaging: "Warning! This software could be hazardous to your health."

You see, like black coffee, fast cars and Pac-Man, these four utility programs can be habit-forming or even addictive. Perhaps there will be a public outcry about such software. After all, if a program lets you probe the inner workings of the Apple disk operating system, can social disorder be far behind?

But don't get the wrong idea. Bag of Tricks is not another bit or nibble copier aimed at defeating software protection schemes. Authors Don Worth and Pieter Lechner created the programs as a way to handle disk manipulation, error detection and error recovery. But in meeting their stated goal, the authors also made a set of programs that will be useful to copy artists.

The Bag of Tricks programs can be used by the average computerist as well as by the expert programmer. While you don't need to be a technical wizard to get your money's worth, it wouldn't be a bad idea if you had some schooling in how the Apple disk system works. Lechner and Worth make frequent references to their book *Beneath Apple DOS*, almost making it a mandatory extension of the documentation. Of course, there are other texts that cover the same ground. You may even find the *Apple DOS Manual* a helpful starting point.

My first encounter with the Bag of Tricks program came when a friend asked me to make some minor changes in a commercial educational program. Stymied by attempts to make backups with Apple's COPYA and FID programs, I turned to TRAX. The Bag of Tricks documentation states that TRAX is the most challenging of the four programs, so I couldn't help but give it a try.

Resembling the read half of a byte copier, TRAX works with 13- and 16-sector disks, checking the integrity of each track's data and then storing it in a buffer so it can be examined.

TRAX offers two modes. The first, Analysis, searches a disk track for gaps, attempting to identify the address and data fields for each sector. TRAX Analysis verifies that the data is correctly formatted and then displays the prologue, volume, track, sector, checksum and epilogue for each address field and the prologue and epilogue for each data field. Anomalies are highlighted and there is a provision for looking at individual data checksums.

The Raw Dump mode displays the data just as it was read, with no indication of address or data field boundaries. Making sense out of this hex-encoded information requires some skill, not to mention patience.

Being an "average" user, I didn't take the time to decode the data; instead, I just looked for patterns that would indicate that something was amiss. It's easy to scroll the buffer either one line at a time (eight bytes of data per line) or one page (80 bytes) at a time.

Make Tracks

TRAX is simple to use. The Analysis mode has 12 single-key commands and Raw Dump has just nine. The commands are supplemented by 13 different messages. TRAX's biggest drawback is the need for a normal or near-normal disk. That rules out using it with copy-protected software.

A track-by-track, sector-by-sector, byte-by-byte examination of raw data could take hours. Luckily, TRAX incorporates a feature called Verify that lets you quickly locate any suspect data. Of course, you'll need another program to correct the problem, since TRAX only reads and displays information.

By using TRAX, I learned that my mystery disk used an almost normal 13-sector format and that all of the data was intact. Had I found something amiss, I might have used INIT to fix it.

Like the Apple program of the same name, Bag of Tricks' INIT is used to format a disk. The big difference is that the Tricks version of INIT lets you initialize just one track, a range of tracks or the entire disk. You can direct INIT to read and store the data and then return it to the re-initialized disk.

Track selection and data preservation

aren't the only distinctions of the Bag of Tricks INIT program. It also lets you reskew disks.

Briefly, skewing is the logical order of sectors on a disk. The designers of the DOS 3.3 system chose a "two-descending skew"—great for booting a disk but inefficient for other operations, like loading or saving Applesoft or machine language files. By changing the physical order of sectors on the disk, these operations are accomplished in ten to 50 percent less time than with a normally skewed disk.

Reskewing is the basis of many "fast DOS" enhancements on the market today. The Bag of Tricks program allows you to reskew different tracks in order to get optimal performance. The Bag of Tricks documentation gives a thorough description of the skewing process, but makes only a few suggestions for implementation while encouraging user experimentation.

An Intriguing ZAP

ZAP is probably the most intriguing of the four Bag of Tricks programs. More than any other piece of software I have owned, it has kept me up through the wee hours of the morning.

ZAP is simply a way to read and write to a disk on the track and sector level. It deals strictly with the data, leaving material like address fields and checksums to a program like TRAX. The idea behind ZAP is not new.

Don Worth wrote a utility for an IBM 360, a mainframe computer, a number of years ago. But what distinguishes ZAP from its predecessors and even most of its rivals is its degree of interaction. You can move about, changing a byte here or there, with just a few key strokes.

ZAP has at least 50 commands. Luckily, even a novice can learn a few commands and get results. ZAP uses 16 256-byte buffers to store the contents of any track/sector combinations you select.

Working in a fashion similar to that of a word processor, you can examine the contents of a buffer and move back and forth, making changes. Only after "unlocking" a disk and giving a Write command will the buffer contents replace the original contents on the disk. This is typical of the program's friendliness, with typing errors more likely to generate a "syntax error" warning than a trashed buffer.

A complete description of ZAP's commands is beyond the scope of this review. Among its noteworthy features is the ability to read and write to traditional 13- and 16-sector DOS disks as well as Pascal and CP/M disks.

ZAP supports a printer, allowing you to make screen dumps or to keep a log (audit trail) of changes. Catalog sectors are located automatically, as are individual files. You can compare the contents of

two buffers or look for a particular character combination. Two display modes are available, including one where inverse, blinking and control characters are shown.

As you become familiar with ZAP, the natural tendency is to stick to the tried and true commands, yet at the same time admitting to yourself that there has to be a better way to carry out some operations. Chances are that the "better way" is available as one of the more sophisticated commands.

After spending an hour of laborious sector-by-sector copying, I turned the page in the manual and discovered macros, a way to write your own commands that accomplish multiple tasks. Another 2 a.m. discovery was a way to tag track sector combinations with familiar names instead of with forgettable identifiers, like 10,C.

The temptation is to go on and on about ZAP's features. There is a disassembler command and help command. It's just like a powerful editing program. The more you use it, the greater the power you have available.

What's New? FIXCAT

The fourth and final trick to be pulled out of the bag is FIXCAT.

This program differs from the rest in that it works automatically; besides answering a few prompts, all that the user has to do is sit back and let the computer do its thing. What that "thing" is, is the verification of the catalog and volume table of contents (VTOC). This looks for deleted or missing files and corrects any anomalies.

FIXCAT is just the program to cure the "I-deleted-my-file" blues. As long as you haven't added a lot of new data to the disk, chances are that FIXCAT can find your precious file and restore it to good standing in the catalog. FIXCAT can also handle chores like the releasing of tracks 0, 1 and 2, normally reserved for DOS and for general use.

Unless you are well-steeped in the DOS catalog and related functions, the operation of FIXCAT may seem mysterious. Luckily, FIXCAT doesn't make any changes to the disk until you tell it to, and even then it shouldn't do irreparable harm.

For example, during one late-night session, I ran FIXCAT only to find that it eliminated what little catalog I did have. I skipped breakfast the next morning in order to sneak in a few minutes of computing (like I said, this software is addictive), and lo and behold, when I reran FIXCAT I got my catalog back—complete with improvements!

You may have guessed that I'm a satisfied Bag of Tricks user. But there are a few areas left for improvement.

First is documentation. With the exception of its coverage of skewing, I found it to be heavily dependent on outside

sources of information. The obvious way around this is to buy a book like *Beneath Apple DOS*. This manual is not overlaid with real-life examples of the programs in use, but there are enough instructions, particularly in the "Advanced Tutorials" chapter, for you to get a start.

TRAX may be the sleeper of the bunch. But until a provision for writing raw data to disk is included, it remains a diagnostic rather than a corrective tool. Other additions I would like to see include a printer option for TRAX and a reference that lists the various commands so that I don't have to leaf through the indexless manual.

My final complaint centers around the lack of consistency between programs. For example, TRAX and INIT, written by Lechner, use Escape as the exit, but for ZAP and FIXCAT, written by Worth, you type End. As my software repertoire increases, I find myself getting confused about what commands go with what program, so every little bit of standardization helps.

With a list price of \$40, Bag of Tricks costs about twice what a typical game does. But as my family and friends will attest, you can get just as much fun "playing" with utilities as you would from the latest adventure game. And, as a bonus, you just might salvage a disk or two.

Bag of Tricks is copy-protected, and, appropriately enough, can't be read by its own programs. However, there is a replacement policy for defective disks, and one backup disk can be purchased for \$5 plus shipping.

Utility programs like ZAP, TRAX, INIT and FIXCAT are among the unsung heroes of the software industry. Many a homeowner gets by with a handful of rudimentary tools, just as many computerists' needs are satisfied by the stock tools, like FID and COPYA.

The true craftsman, though, is usually satisfied with nothing but a truly professional tool. That's the category Bag of Tricks belongs in. It's available from Quality Software, 6660 Reseda Blvd., Suite 105, Reseda CA 91335.

Tim Daniel
Peterborough, NH

The Final Word

Just what you always wanted:
A word processor that turns
Thoughts into sentences

The search for the final and ultimate document creator goes on. We all want a word processor that will literally reach into our minds, pull out our thoughts and put them on paper in powerful and effective sentences. Preferably, this should be done with a minimum of conscious effort and almost automatic formatting.

Final Word isn't that good, but these thoughts were certainly taken seriously

by the people at Mark of the Unicorn, Inc., since they may have created, in fact, "The Final Word"—at least in the number of word processing features in one program.

By integrating a tremendous variety of editing and formatting features with innovative thinking, the company has created a package with great power and utility. However, like all powerful and useful tools, it requires some mastery.

The Final Word makes difficult tasks a piece of cake.

Advanced Features

The Final Word contains an advanced editor and formatter that displays and edits two pieces of work at the same time.

By dividing the screen into two horizontal windows, you can display two text files (or different portions of the same text file) and move the cursor between them. You can create an executive summary in the upper window while scrolling through the main text in the lower window. The program lets you move text from one file to the next while observing both. The Final Word also lets you scroll through one window while the other remains still.

Additional features include user-customizing of the 40 function keys and cursor controls, footnoting, multiple printer support using a printer configuration selection list, on-screen relative position indication, a menu-driven editor if you need it, split-screen editing, state save, easy entry and exit, and many other less frequently used features.

The Final Word is especially good for people who generate long, complicated documents or books that use summaries, indexes, footnotes or tables. It's good for checking internal references in a document, and it's a great help to authors who have to keep consistency through long works.

The Final Word uses a technique called virtual memory to enable editing of many documents at the same time. This feature uses a disk swap file holding more than 240K of text.

By paging the text to and from memory through the swap file, the only limit to the number or length of the documents is the size of the swap file itself.

The use of the disk-based swap file also allows a feature called *state save* to automatically save your working text in permanent disk storage as it is created. The state save feature will ensure that a current version of the text is on the disk even if the power fails. The next time you enter the program, the text you were last editing will reappear on the screen. The pro-

gram also will remember the editing and formatting commands (e.g., right/left justify) last in effect.

Whenever you stop keyboard input for five seconds, the program automatically writes the text to the swap file on disk without changing any of the original file content. This enables recovery after system crashes, and retains the newly edited text plus the original file.

Overall, The Final Word is an excellent word processing tool. Surprisingly, it doesn't have features such as column movement, horizontal scrolling and variable tabs—features found in much less elegant programs.

Five areas make this program stand out:

- State save—the system crash saver that also allows you to interrupt your work for any reason without loss of text.
- Split screen viewing and editing for document comparison.
- The ease of the initial setup through the customization of function keys.
- Editing and cursor movement commands that enable logical editing simplicity.
- Advanced formatting commands, like user-defined style parameters, automatic footnoting and numbering, and index tagging are what make the creation of even the most difficult documents "a piece of cake."

What You Need

The Final Word works under MS DOS (IBM PC DOS) version 1.0 or 1.1, with a version for CP/M-86 soon to be available. For efficient use, a minimum of 128K RAM is suggested, but the program will operate with 64K RAM.

Since it comes on two disks (around 180K of disk space is needed), two disk drives are necessary. You could get by with two 160K single-sided drives, but it would be useful to have at least one double-sided 320K drive.

The best configuration would contain 128K of RAM with two double-sided disk drives. The program can be used with almost any kind of printer (mine is a NEC 7730) and with either the IBM monochrome monitor or any monitor connected to the Color/Graphics Adapter Card. It should be noted that only the monochrome adapter card displays actual underlining on the monitor screen.

Almost Perfect

Final Word is closely related to the Perfect Writer word processing program. Perfect Writer is a licensed version of an early relative of The Final Word. It has some differences, but if you have used Perfect Writer, you will find Final Word to be similar. The Final Word is a product of Mark of the Unicorn, PO Box 423, Arlington, MA 02174 (617-576-2760). It retails for \$300.

Frank Derfler
Herndon, VA

DBi Software.
A dazzling starstream
of wisdom, wonder
and wizardry.

Once, not too long ago, all microcomputer software systems were quite alike.

Rigid.

Regimented.

And boringly non-creative.

However, DBi's very unique, very Advanced SystemPac has put an end to all that.

It is, quite precisely, a marvel of software ingenuity and performance.

What it does – and does extremely well – is enable you to smoothly interface your microcomputer with word processing, data processing, and communications networks.

A pleasure to use, our Advanced SystemPac contains a highly sophisticated language that also permits you to write and implement your own data processing operating environ-

ment (DPOE) with any computer that operates with CP/M, MS DOS and PC DOS.

But, possibly the best news of all is that our DBi starstream universe of wisdom, wonder and wizardry can be yours for a price that is not out of this world.

So contact your local Victor microcomputer dealer today, or any of the other fine computer centers in the United States and Canada.

And be one of the first to soar into the 21st Century.

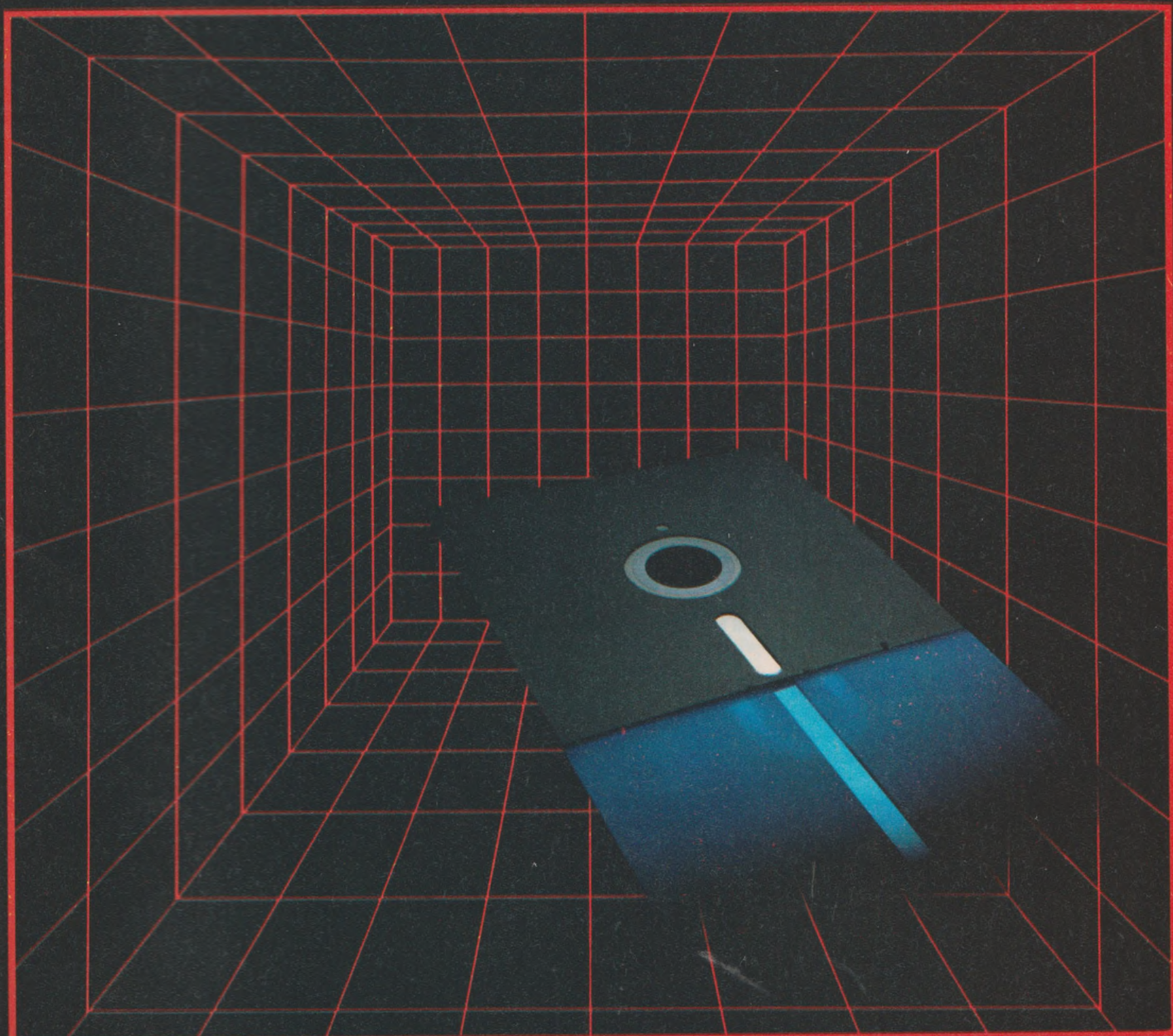
Circle 286 on Reader Service card.



Software Products
Turning innovation into information.

102 South Main Street
(517) 772-5055

Mt. Pleasant, MI 48858



Health-Aide + Apple Keeps the Doctor Away At Last—The Final Word! Bag of Tricks—A Copy Artist's Dream

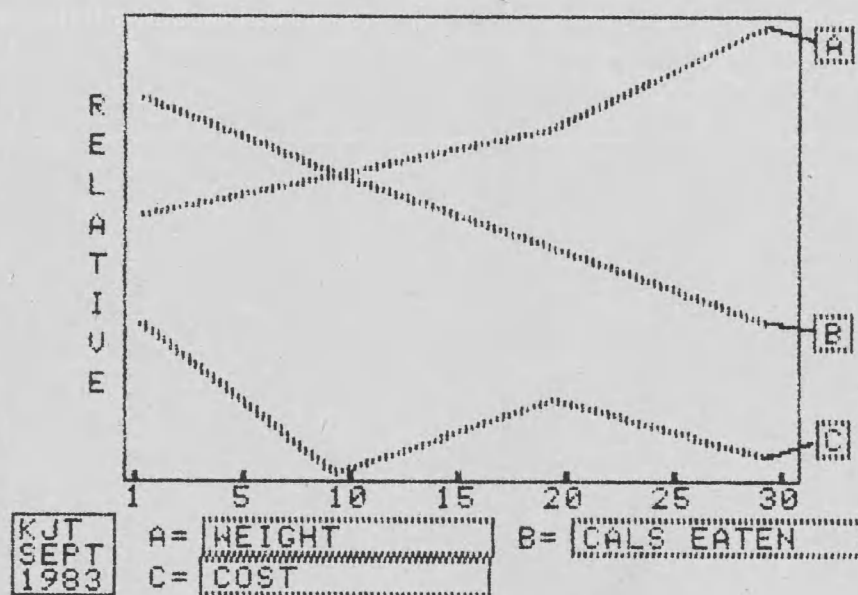


Fig. 1. Hi-res screen of monthly weight vs. cost vs. calories. One of an almost infinite number of combinations of elements that can be graphed.

Health-Aide

Use this
Program to stay
Healthy and slim

Health-Aide is a comprehensive health, nutrition and personal data software package for the Apple II that can be used to plan meals and keep track of daily, monthly and yearly nutritional consumption. The program has been designed to serve three groups of people: the individual interested in tracking his own health and nutrition, professionals involved in health care and nutrition analysis, and educational institutions involved in teaching nutrition and health care.

The program contains a database of more than 700 foods. Each food has 35 different nutrients stored (calories, protein, vitamins, minerals and so on) plus a

cost index. This index is referred to often in different segments of the program.

The program menu contains eight programs that can be used separately (for those only interested in certain aspects of nutrition) or together (certain reports will interrelate data found in the separate programs).

The first program, Needs, sets up your personal requirements based on the RDA (recommended daily allowances) standards. You are asked for your name, sex, age and height. The program then looks up your personal RDA and inserts those values in 25 nutrition categories.

This information will be referred to often by the computer as you plan menus and exercise programs.

One of the more interesting programs is called Eat. This program will analyze the number of calories burned in any given day by asking you to detail how many minutes you spent on any of 26 activities. They range from eating (.006

energy use) to racquetball (.195).

The program computes your activity and adds this to the basal metabolic value it computed in the Needs program. To complement the expanded energy section is the menu-planning section. You are given four screens—one for each meal (plus snack).

You enter the foods you will eat using the enclosed chart (Table 1). After each entry, the values for each food are calculated and added to the nutrient displays (Table 2). At any time you can add or subtract foods to achieve a desired meal priority, whether it be watching calories, protein, carbohydrates or any of the other elements.

The convenience of this feature simplifies meal planning. You can store particular menus for later use. You can even retrieve meals by merely telling the computer what calorie range you would like—it will then offer a menu to fit the requirement. Finally, after planning a number of meals, the program will even print a shopping list!

The Food program will give an itemized breakdown of any particular food by merely typing in its code number. If a food is not included in the database, you can add it.

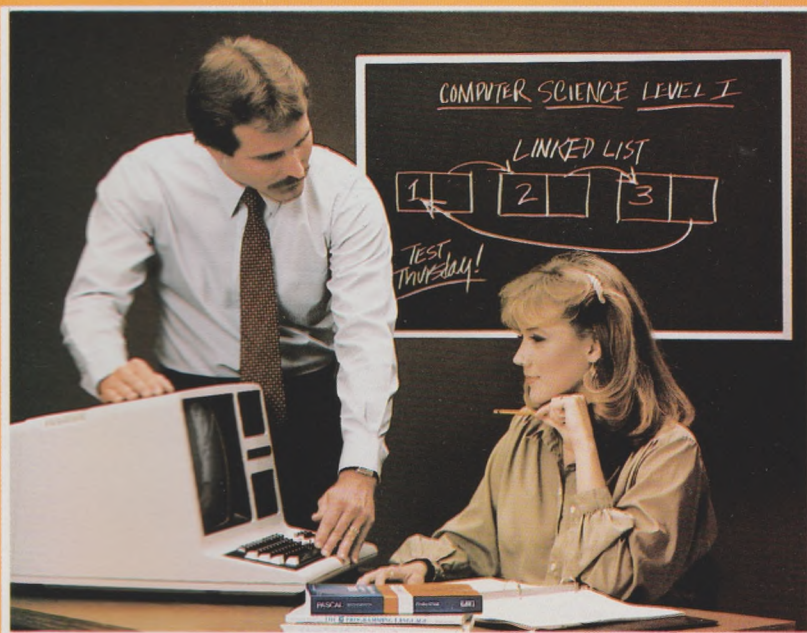
The INQ (Index of Nutritional Quality) program will produce a sorted listing of nutrient quality and cost by food or by nutrient item. In Exercise, you will be told how long you must spend at a particular activity to burn a certain number of calories.

The most impressive program in this package is the Month section. This program will create graphs plotting over a month or year (see Fig. 1). The graphs can be easily constructed to plot any three of 42 choices.

For example, if you kept a log of activity and food intake over a month period, you could plot weight vs calories burned

(Continued on p. 142)

MAXI PROGRAMMING FOR MICRO-COMPUTERS



Let ALCOR Language Systems Transform You Into a Professional Programmer

ALCOR languages can guide you step-by-step from novice programmer to a seasoned professional. All of our systems are easy to use and share a clean, simple interface. In fact, all systems require only two commands to compile and execute a program!

Are You Tired Of Struggling With The Documentation?

No longer will you have to fumble through poorly written manuals filled with a peculiar dialect of progamese. Each of our languages come with a complete and well organized documentation set that includes a special language tutorial for new programmers.

Never again will you have to figure out whether a problem is a language bug or a programming error.

For reliability, all ALCOR language compilers utilize state-of-the-art design techniques. The result is unequalled reliability and performance.

Mainframe power and sophistication on micro computers.

Are you tired of being told that the other language is a subset of the real thing? All ALCOR language systems are complete language implementations with all



of the features expected in professional programming environments.

Compatibility is a reality, not an advertising gimmick.

All ALCOR languages were designed by our own highly trained and professional staff of programmers. Not borrowed or copied, but exclusively created by us so that you can develop libraries of routines in any language that are callable from any other language.

ALCOR language systems run on a wide range of computer and operating system combinations.

Professional programmers know that the portability of a program is a crucial factor in applications. Rewriting applications every time you change computers is a waste of your valuable time and unnecessary with ALCOR languages.

If you want to develop quality software, do it with the quality language system from ALCOR.

MULTI-BASIC—A revolutionary approach to compiler design. MULTI-BASIC is the first language system to solve the BASIC compatibility problem. Not only does it support powerful features such as recursion, it compiles both MBASIC and CBASIC programs!

C—ALCOR C is the perfect tool for systems programmers. It is a complete C implementation as described in the Kernigan and Ritchie book "The C Programming Language."

PASCAL—A powerful Jensen and Wirth standard Pascal that is packed with the features necessary for serious program development such as random access files, dynamic strings and separate compilation.

These language systems are now available for most Z-80 based micro-computers with CP/M or TRSDOS compatible operating systems. 8086 and 68000 versions soon.

Yours for the asking!

☐ **Yes!** Please rush via return mail your information package describing these new languages now available.

- ☐ Pascal
- ☐ Multi-Basic
- ☐ C Language.

Name _____

Address _____

City _____

State _____

Zip _____

FREE information-packed brochure.

Call or write today to:

ALCOR Systems

800 W. Garland Avenue, Suite 204
Garland, TX 75040
Telephone: (214) 494-1316

Dealer, Distributor and OEM Inquiries Invited.

TRS-80 and TRSDOS are trademarks of Tandy Corporation. CP/M and CBASIC are trademarks of Digital Research. MBASIC is a trademark of Microsoft.

© 1983, ALCOR Systems, Garland, Texas

THE SECRETS OF PERFECT MEMORY: ONE AND ONE HALF EARTH DOLLARS

AT LAST: THE WHOLE
TRUTH ABOUT FLOPPIES.

Amazing book reveals
all!

How to keep from
brainwashing your disk
so it never loses its
memory.

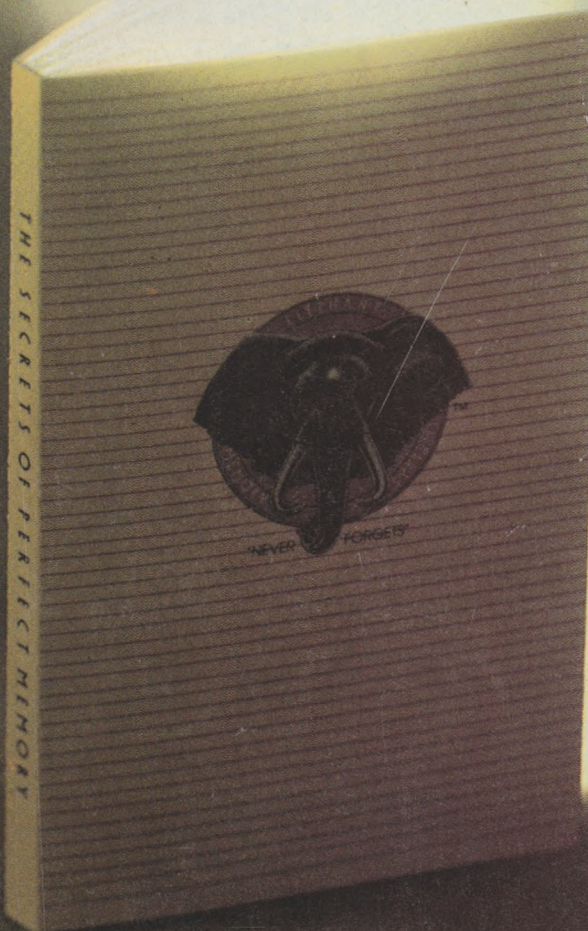
How fingerprints can
actually damage disks.
Unretouched Kirlian
photographs of UFO's
(Unidentified Floppy
Objects)! The incredible
importance of making
copies: the Department
of Redundancy Depart-
ment—and what goes on
when it goes on! Power-
ful secret methods that
scientists claim can ac-
tually prevent computer
amnesia! All this, and
much more . . .

In short, it's an 80-
page plain-English,
graphically stunning,
pocket-sized definitive
guide to the care and
feeding of flexible disks.

For The Book, ask your
nearest computer store
that sells Elephant™
disks, and bring along
one and one half earth
dollars.

For the name of the
store, ask us.

**ELEPHANT MEMORY
SYSTEMS®** Marketed
exclusively by Leading
Edge Products, Inc.,
Information Systems
and Supplies Division,
55 Providence Highway,
Norwood, MA 02062. Call
toll free 1-800-343-8413.
In Massachusetts, call
collect (617) 769-8150,
Telex 951-624.



See us at Booth #3327



COMDEX/Fall '83

November 28-December 2, 1983